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TO READERS AND CORRESPONDENTS.

ALL communications intended for insertion in the Original Department of this Journal are only received for consideration with the distinct understanding that they are sent for publication to this Journal alone, and that abstracts of them shall only appear elsewhere subsequently, and with due credit. Gentlemen favouring us with their communications are considered to be bound in honour to a strict observance of this understanding.

Contributors who wish their articles to appear in the next number are requested to forward them before the 1st of August.

Liberal compensation is made for all articles used. Extra copies, in pamphlet form with cover, will be furnished to authors in lieu of compensation, *provided the request for them be made at the time the communication is sent to the Editor.*

The following works have been received:—

Grundzüge der Physiologie des Menschen mit Rücksicht auf die Gesundheitspflege. Von JOHANNES RANKE, Dr. Med. und Prof. an der Univ. zu München. Vierte umgearbeitete Auflage. Leipzig: Wilhelm Engelmann, 1881.

Die Temperatur des gereizten Säugethiermuskels. Von Dr. MEADE SMITH. Ueber Nasenblutung, Nasentamponade und deren beziehungen zu erkrankungen des Hörorganes. Von Dr. ARTHUR HARTMANN, in Berlin.

Ueber der sogenannten Schnellenden Finger. Sturz aus einem Fenster des dritten Stockwerkes ohne gefährliche Verletzungen. Ein Fall von Lipoma multiplex symmetricum. Von Dr. CARL FIEBER.

De la Phthisie Pulmonaire et de sa Curabilité. Par JEAN LOUIS SIMON JOLY, Docteur en Médecine. Paris: J. B. Baillière et Fils, 1881.

Impressions et Aventures d'un Diabétique a travers la Médecine et les Médecins. Par le Docteur JULES CYR. 2me ed. Paris: Ad. Delahaves et E. Lecrosnier, 1881. Transactions of the Obstetrical Society of London. Vol. xxii. for the year 1880. London: Longmans, Green & Co., 1881.

On Anchylosis, and the Treatment for the Removal of Deformity and the Restoration of Mobility in various Joints. By BERNARD E. BRODHURST, F.R.C.S. 4th ed. London: J. & A. Churchill, 1881.

Dysmenorrhœa: its Pathology and Treatment. By HEYWOOD SMITH, M.A., M.D., Oxon. London: J. & A. Churchill, 1881.

Lectures on Diseases of Bones and Joints. By C. MACNAMARA, F.R.C.S. Eng., Surgeon and Lect. on Surgery at the Westminster Hospital, etc. Second ed. London: J. & A. Churchill, 1881.

Mr. Spencer Wells's Note Book for Cases of Ovarian Tumours. 6th ed. London: J. & A. Churchill, 1881.

Observations on Fatty Heart. By HENRY KENNEDY, A.B., M.D., Univ. Dubl. Dublin: Fannin & Co., 1881.

Report on "Surra" Disease. Military Dept., Dec. 1880.

Experimental Researches on some Points relating to the Normal Temperature of the Head. By J. S. LOMBARD, M.D., formerly Assist. Prof. of Physiology in Harvard University. London: H. K. Lewis, 1880.

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The Relations of the Abdominal and Pelvic Organs in the Female, illustrated by a full-sized chromo-lithograph of the Section of a Cadaver frozen in the Genu-pectoral position, and by a series of Wood-cuts. By Prof. ALEXANDER RUSSELL SIMPSON and Dr. DAVID BERRY HART. Edinburgh: W. & A. K. Johnston, 1881.

On Axis Traction Forceps. By ALEX. R. SIMPSON, M.D. Edinburgh, 1880.

On Lethargy in Trance. By THOMAS MORE MADDEN, M.D.

Lectures on Diseases of the Nervous System, especially in Women. By S. WEIR MITCHELL, M.D. Philadelphia: Henry C. Lea's Son & Co., 1881.

An Introduction to Pathology and Morbid Anatomy. By T. HENRY GREEN, M.D. Lond. Fourth Am. from the fifth revised and enlarged English edition. Philadelphia: Henry C. Lea's Son & Co., 1881.

Medical Electricity: A Practical Treatise on Applications of Electricity to Medicine and Surgery. By ROBERTS BARTHOLOW, A.M., M.D., LL.D., Prof. of Mat. Med. and Gen. Therapeutics in Jefferson Med. Coll. of Phila. Philadelphia: Henry C. Lea's Son & Co., 1881.

A Treatise on Bright's Disease and Diabetes, with especial reference to Pathology and Therapeutics. By JAMES TYSON, A.M., M.D., Prof. of Gen. Pathology and Morbid Anat. in Univ. of Penna. Including a Section on Retinitis in Bright's Disease. By WILLIAM F. NORRIS, M.D., Clin. Prof. of Ophthalmology in Univ. of Penna. Philadelphia: Lindsay & Blakiston, 1881.

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A Treatise on Diseases of the Joints. By RICHARD BARWELL, F.R.C.S. Second ed. revised. New York: William Wood & Co., 1881.

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On the Antagonism between Medicines and between Remedies and Diseases. By ROBERTS BARTHOLOW, M.A., M.D., LL.D. New York: D. Appleton & Co., 1881.

A Text-book of Practical Medicine. By Dr. FELIX VON NIEMEYER. Translated by GEORGE H. HUMPHREYS, M.D., and CHARLES E. HACKLEY, M.D. Revised ed., 2 vols. New York: D. Appleton & Co., 1881.

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Anatomical Plates arranged as a Companion Volume for "The Essentials of Anatomy," and for all Works upon Descriptive Anatomy. Edited by AMBROSE L. RANNEY, A.M., M.D. New York: G. P. Putnam's Sons, 1881.

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Clinical Lectures on the Physiological Pathology and Treatment of Syphilis, together with a Fasciculus of Class-room Lessons covering the Initiatory Period. By FESSENDEN N. OTIS, M.D., Clin. Prof. of Genito-Urinary Dis. in Coll. of Phys. and Surgeons, N. Y. New York: G. P. Putnam's Sons, 1881.

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How to use the Forceps. With an Introductory Account of the Female Pelvis and of the Mechanism of Delivery. By HENRY G. LANDIS, A.M., M.D., Prof. of Phthisis in Starling Medical Coll. New York: 1881.

A Manual of the Practice of Medicine. By HENRY C. MOIR, M.D. New York, 1881.

United States Marine-Hospital Service. Report on Trichinæ and Trichinosis. Prepared under the direction of the Supervising Surgeon-General. By W. C. W. GLAZIER, M.D., Assist. Surgeon, M. H. S. Washington, 1881.

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- Sub-hyoidean Pharyngotomy for the Removal of the Epiglottis for Epithelioma. By CLINTON WAGNER, M.D. New York, 1881.
- The Hygiene of Emigrant Ships. By THOMAS J. TURNER, M.D. Boston, 1881.
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- Simple Methods to Staunch Accidental Hemorrhage. By EDWARD BORCK, M.D. Evansville, Ind., 1881.
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- Biennial Report of the North Carolina Board of Health, 1879-1880. Raleigh, 1881.
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- Report of the State Lunatic Asylum, Utica, N. Y., 1880. Albany, 1881.
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- Proceedings of Academy of Natural Sciences of Philadelphia, Oct. to Dec., 1880.
- Proceedings of American Pharmaceutical Association, 1880. Philadelphia, 1881.
- The following Journals have been received in exchange :—
- Canada Medical and Surgical Journal. Sept. 1880, to May, 1881.
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- Canadian Journal of Medical Science. Oct. 1880, to June, 1881.
- Canada Lancet. Oct. 1880, to May, 1881.
- L'Union Médicale du Canada. Oct. 1880, to Mai, 1881.
- Boston Medical and Surgical Journal. Oct. 1880, to June, 1881.
- New York Medical Journal. Oct. 1880, to June, 1881.
- Medical Record. Oct. 1880, to June, 1881.
- American Journal of Insanity. Oct. 1880, Jan., April, 1881.
- American Journal of Obstetrics. Oct. 1880, Jan., April, 1881.
- Archives of Medicine. Oct. 1880, to June, 1881.
- American Journal of Otology. Oct. 1880, Jan., April, 1881.
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- Annals of Anatomy and Surgery. Sept. 1880, to May, 1881.
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THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR JULY 1881.

ARTICLE I.

MAY IODIDE OF POTASSIUM EXCITE BRIGHT'S DISEASE? By I. EDMONDSON ATKINSON, M.D., Professor of Pathology and Clinical Professor of Dermatology in the University of Maryland School of Medicine, Baltimore.¹

WHERE there is afforded opportunity of examining after death, the bodies of persons who have suffered from late syphilis, an astonishingly large number of them will be found to present evidences of disease of the kidneys. In 24 autopsies of syphilitic subjects, Lancereaux observed renal degenerative changes 8 times (*Gaz. Hebdom.* 1, 1864, p. 502). Moxon detected alterations in these organs in 14 out of 25 post-mortem examinations of syphilitics at Guy's Hospital (*Guy's Hosp. Reports*, 1868, p. 329). It must be acknowledged, however, that if we consider the whole number of persons who have had syphilis, the proportion who develop kidney disease is exceedingly small. Indeed, with very few exceptions, syphilis and kidney disease would seem to exist in the relations of cause and effect only among those unfortunates who experience the late or tertiary manifestations of the affection.

Pathologists have long been aware that the diseased kidneys of syphilitic persons present differences as great in microscopic as in gross appearances, changes that may be encountered with equal, even with greater frequency, as results of other affections, as well as changes that are essentially syphilitic. Of the forms of disease to which I now refer, the most frequent by far is one that is not in itself syphilitic. This is lardaceous or albuminoid degeneration, and was first described as of syphilitic origin, by Rayer, in 1840 (*Maladies des Reins*, t. ii. p. 489). All subsequent

¹ Read at the meeting of the American Medical Association, at Richmond, May 4, 1881.

writers have remarked its frequency. Moxon, in the article already quoted, observed, in his 27 autopsies, lardaceous degeneration of the kidneys 11 times. But the frequency of lardaceous disease as the result of syphilis, may be more readily appreciated by studying the etiology of this form of degeneration. Thus Fehr (quoted by Roberts) reported syphilis as present in 34 out of 145 cases of lardaceous kidney. Dickinson (*Dis. of Kidneys*, part ii. 1877, p. 473), compiled 83 cases of lardaceous disease from the dead-house reports of St. George's Hospital, the presence of syphilis being noted 18 times. This form, when of syphilitic origin, is identical with the same degeneration in persons free from the disease. It is true that some writers, Beer more especially (*Die Eingeweide Syphilis*, 1867), describe peculiar conditions and distributions of the process, to be met with only in syphilitics; but these lack confirmation. On the other hand, there is a form of renal disease quite characteristic of syphilis, the circumscribed, new formation known as gummy tumour. This is of exceedingly rare occurrence. Moxon found it but once in his 27 autopsies, where there were 16 cases of renal disease. In Lancereaux's 24 autopsies, where kidney disease was detected 8 times, gummy tumours were met but once. Numerous cases of gumma of the kidney have been recorded, but the lesion is undoubtedly a rare one. From 1 to 20 may be encountered, and their size may vary from a mere point to the dimensions of "a small potato." It is stated, upon the authority of Beer, Moxon, and others, that purely parenchymatous nephritis may be dependent upon syphilis. It must be very infrequent. But there is still another form of renal alteration of syphilitic origin.

Generally diffused, interstitial hyperplasia and subsequent fibrosis of the kidneys, not associated with lardaceous disease, is rare in syphilitics; and yet it is not uncommon to find these organs with circumscribed areas of interstitial hyperplasia, or of its cicatricial remains, distinct from ordinary gummy tumor. Just as one finds in other organs, notably, the liver, lungs, and testicle, syphilitic inflammation, not at all differing in their appreciable morbid appearances from simple inflammations, so, in the kidneys, we encounter diffused interstitial nephritis, that except for a disposition to more circumscribed distribution is like interstitial nephritis from other causes.

Where the process involves the entire organ, there is no way of deciding upon its specific origin. Most frequently, however, only a portion of the kidney is affected, and when considerable contraction has resulted from this form of interstitial disorder, it is often seamed with scars, which from their circumscribed arrangement, are very characteristic. It is not unlikely that localized cicatrices may sometimes result from the absorption of gummy tumours. A considerable degree of fatty degeneration of the epithelia of the tubules often accompanies these processes.

From the foregoing remarks, it will be seen that of the different altera-

tions to which the kidneys of syphilitics are liable, but one can be regarded as certainly syphilitic, the gummy tumour, the most rare of all. Diffused nephritis can only be recognized as *probably* syphilitic, when of limited and circumscribed extent. On the other hand, lardaceous degeneration, most often observed, is only a result of syphilis as it is a result of tubercle, of scrofula, of prolonged suppuration. Now, while it is certain that we may have these forms of disease due to syphilis, it by no means follows that disease of the kidneys in syphilitics is always of syphilitic origin. May it not arise from adventitious causes more often than is generally supposed?

It is evident, that apart from any influence that syphilis may exert in renal pathology, the kidneys of syphilitics are just as subject to morbid influences as those of healthy people, and that one should not necessarily attribute to this disease lesions that are not characteristically specific.

One occasionally finds in medical literature, statements that albuminuria and nephritic inflammation have been known to arise in consequence of the ingestion of the iodide of potassium. These reports, it is true, are few in number and quite vague in character, and yet they come from sources that entitle them to respectful consideration. Thus Van Buren and Keyes (*Genito-Urinary Diseases with Syphilis*, p. 380), state that it will sometimes happen—

“that patients with visceral syphilis, under protracted treatment, by large doses of iodide of potassium, will gradually show morning nausea, and upon examination their urine will be found light, slightly albuminous, and containing pale casts. In such cases the kidney-trouble is probably due to the irritation produced by the large amount of iodide of potassium passing through them, and the albumen and casts may be made to disappear, together with the morning nausea, by reducing the activity of the treatment. Several such cases have fallen under the author's observation.”

In another place Keyes again writes (*Venereal Diseases*, 1880, p. 220): “I am certain that in some cases, slight, transient, albuminuria is produced by the prolonged use of the iodide of potassium in large doses.” Mr. Jonathan Hutchinson in his famous address on syphilis before the Pathological Society of London (*Lancet*, 1, 1876, p. 204), thought that iodide of potassium, long-continued, might have had something to do with producing the long-continued albuminuria that preceded death in two cases of inherited syphilis in adults under his care. H. C. Wood (*Therapeutics, etc.*, p. 379), says: “During its passage through the kidneys, iodine undoubtedly exerts an influence upon these organs, as is shown by its producing albuminuria at times. It is indeed asserted, that it occasionally causes a true tubular nephritis.” Statements such as these may be found in medical literature, but they lack definiteness, and can hardly be accepted as decisive. They must be received with a great deal of reserve, especially when we consider that the very extensive literature that has been devoted to the pathological effects of iodine and the iodides upon the

system, is singularly meagre in references to these actions upon the kidneys, while the diuretic action of these drugs is universally recognized, and abundant proof of the morbid action often exerted by them upon different organs and tissues is everywhere available.

It is remarkable that alterations of the kidneys have been but rarely observed as resulting from their ingestion. Rodet, writing in 1847, states that the ingestion of the iodide of potassium may induce nephritis, and records a case where the patient, 56 years old, took, for non-syphilitic disease, one gramme of the iodide daily for fifteen days, abundant hæmaturia resulting. This subsided after the medicine was discontinued, but recurred when it was again administered (*Gaz. Méd. de Paris*, 1847, p. 904). A very remarkable statement of Simon and Regnard may be found in *L'Union Médicale* (vol. 22, 1876, p. 26). It was noticed that two children (girls), to whose integument tincture of iodine had been applied over a limited surface, for different affections, betrayed some symptoms of iodism, along with a notable quantity of iodine in the urine, and albuminuria. Attention having been drawn to this fact, eleven children were submitted to the same treatment. Of these, four developed albuminuria. In three other cases, where the urine previous to the experiment contained neither iodine nor albumen, both became very evident after three days, soon ceasing to appear, but both reappearing upon the renewal of the application. Badin (*Thèse de Paris*, 1876), contributes in support of these observations two cases. The first patient, a phthisical girl nine years old, had tincture of iodine applied in front of and behind the chest. Albumen was detected in the urine after the third application, and disappeared after the iodine was abandoned. The second observation concerned a scrofulous girl, to whose skin tincture of iodine was applied. After the fourth application, the urine, which had been daily tested, became albuminous, regaining a healthy condition shortly after the conclusion of the experiment. Badin holds that this action is confined to children, the immunity of adults being complete; and that it results from the passage of metallic iodine through the kidneys. These very interesting observations have never been confirmed, and, indeed, do not seem to have met with the attention they deserve. Should their correctness be established, it would still remain undecided how the albuminuria is produced; whether, as claimed, by the action of free iodine upon the kidneys, or, as is not impossible, as the result of the simple covering of a considerable surface with an impermeable coating, such as has been known to produce similar effects under the use of a variety of substances.

A diligent search through a very extensive literature has afforded me only these scanty proofs of the irritating influence of iodine and the iodide upon the kidneys. On the other hand, while the almost entire absence of references to this subject in the very extensive discussions of the phenomena of iodism, during the last forty years, is, to say the least,

very suggestive, we have the distinct statements of several writers, that renal affections are not induced by the iodides. This was the experience of Ricord (*Bulletin de Thérapeutique*, 1842, p. 164), and other writers. Arneth, Pelikan, and Zdekauer never found in the bodies of animals treated with iodine the smallest trace of renal disease (*Med. Zeitschr. Russlands*, 1856).

It is certainly important that we should have definite knowledge concerning the extent to which the presence of these agents in the system is capable of exciting structural alterations in the organs and tissues, and that in our treatment we should not expose our patients to unjustifiable risks. If, however, it be necessary to expose them to these dangers, we should do so with a full consciousness of the same, and be prepared to obviate them as far as possible.

With a view to ascertain to some extent the general condition of the kidneys of persons who suffer from late syphilis, as well as to note the effects of anti-syphilitic treatment upon these organs, I have made a series of observations of cases that have come under treatment, for the most part, in my out-patient service, but also to some extent in the wards of the University Hospital and Bayview Asylum (the city almshouse). They do not represent selected cases, but comprise all that were available during the period of my investigations, suffering from late syphilis, and who, with very few exceptions, had been more than three years syphilitic. My notes embrace memoranda of seventy patients, of whom, those whose condensed histories are subjoined, presented evidence of renal alterations.

CASE 1.—Maria H., 32 years old, syphilitic for eight or nine years. Prostitute. Symptoms severe from the first. Much scarring. Present lesions ulcerative and extensive. General health much reduced. No dropsy. *Dec.* 29. Urine acid, sp. gr. 1022. Albuminous. Iodine reaction. Microscope reveals pus cells in abundance, but no tube casts. *Jan.* 24. Urine acid, sp. gr. 1017. Iodide reaction. Albuminuria. Microscope reveals a few hyaline and pale granular casts of the renal tubules. Pus cells and vaginal epithelium abundant. Has taken much iodide of potassium within the past year.

CASE 2.—John P., 30 years old. Peddler. Syphilitic for thirteen years. Paraplegia five years ago. Epilepsy for two years. Great mental hebetude. Cranial nodes. Excruciating headache. *Jan.* 24, 1878. Has been taking iodide of potassium for some time. Has had no ulcerative lesion. Never had dropsy, but six years ago had some swelling of the feet. Heart healthy. Urine pale and with iodine reaction. Small amount of albumen. Some hyaline tube casts, here and there studded with a cell of renal epithelium. *April* 8. Urine neutral; pale; sp. gr. 1016. A slight cloudiness to nitric acid and heat. No tube casts. *May* 17. Urine acid and high coloured; sp. gr. 1030. Iodine reaction. Albumen copiously present. *Jan.* 14, 1879. Urine alkaline, pale, without iodine reaction. Very slight amount of albumen. No tube casts. *April* 11. Has taken no iodide since last entry. Urine acid, and freely albuminous. Uric acid crystals. Hyaline tube casts, some of them studded with renal epithelium.

CASE 3.—Francis B., negro, 54 years old. Syphilitic more than twenty years. Has never had dropsy. Has led a hard life as a sailor on bay craft. Has now a gummatous ulcer of the penis. General health excellent. Heart normal. *Jan.* 15, 1878. Has had no treatment recently. Urine acid, and of sp. gr. 1026. Very slight precipitate to heat and nitric acid. Hyaline, pale, and coarsely-granular tube casts with renal epithelium. *Feb.* 23. Urine pale, acid, and of sp. gr. 1009. No albumen. No iodine reaction. No tube casts. *March* 22. Has taken iodide of potassium for several weeks until the past few days. To-day the urine contains no iodine, but has a small amount of albumen, also a few pale granular tube casts. *April* 27. Has not been taking iodide. Urine dark, sp. gr. 1020. No iodine reaction. No albumen, a few very pale hyaline tube casts. *April* 17, 1879. No treatment since last entry. Urine free from albumen and tube casts.

CASE 4.—Kate G., mulatto, 36 years old. Married. Syphilitic eight years. Very severe symptoms. Tubercular eruptions, ulcers, and gummy tumours of integument. Tibial and frontal nodes. Has taken much mercury and iodide of potassium. *Feb.* 4, 1878. Urine straw-coloured and acid; sp. gr. 1032. Iodine reaction. (Has been taking iodide since yesterday morning.) Slight albuminuria. Oxalate of lime crystals abundantly present. A few large and small hyaline tube-casts. *March* 6. Has taken no iodide for two weeks, until yesterday morning. Urine pale, acid; sp. gr. 1027. Iodine reaction. No albumen. Plenty of oxalate of lime, but no tube-casts. *14th.* Has taken iodide regularly. Urine, acid; sp. gr. 1030. Iodine reaction. No albumen. No tube-casts. Oxalate of lime in abundance. *April* 8. Urine pale, alkaline; sp. gr. 1020. Small amount of albumen. *June* 3. Has taken no iodide for a month. Urine, acid and without iodine reaction. Small amount of albumen. Hyaline and granular casts. Oxalate of lime crystals. *Oct.* 24. Has been taking no iodide for some time. Urine faintly acid. No iodine reaction. No albumen. No tube-casts. Octohedra of oxalate of lime. *Nov.* 26. Gums slightly affected from biniodide of mercury, of which she has been taking $\frac{1}{12}$ gr. thrice daily, with her iodide. Urine gives iodine reaction; acid; no albumen. No tube-casts. *Dec.* 10. Has taken no iodide for four days. Urine free from iodine; acid; sp. gr. 1030. *March* 16, 1879. Has now been taking for several weeks 10 grains of iodide of potassium thrice daily. Urine shows no albumen to tests, but upon careful microscopic examination a few hyaline casts are detected. *April* 7. Has been taking iodine steadily. Urine, pale, acid; sp. gr. 1027. Iodine reaction. No albumen. Oxalate of lime and a few mucous tube-casts are discovered. *May* 15. Continues to take iodide as before. No albumen. No tube-casts. Oxalate of lime plentiful. *Feb.* 23, 1880. Has taken no iodide for some time. Urine normal. This patient has had upon one or two occasions slight swelling of the feet, but never decided dropsy.

CASE 5.—Mrs. O., coloured, widow, 59 years old. Has had syphilis for 14 years. Faucial ulcers. Destruction of bony and soft parts of nose (partial). *Feb.* 17. Has been taking iodide of potassium for several weeks. Urine acid; sp. gr. 1017. Iodine reaction. Small amount of albumen. Hyaline and pale granular tube casts, the former numerous. *March* 1. Urine normal. *10th.* Has taken no iodide since last entry. Urine pale and acid; sp. gr. 1013. No iodine reaction. Minute amount of albumen. Microscopically, uric acid crystals, many mucous tube-casts

and a few hyaline casts. *April 6.* Urine faintly acid; sp. gr. 1013. (Has taken no iodide since last date.) No albumen. A few hyaline casts. *July 1.* Has taken no iodide since last date. Urine pale and acid; sp. gr. 1012. No iodine reaction. No albumen. No tube-casts. *Oct. 22.* Has not been taking iodide. Urine healthy. *Dec. 12.* Has taken no iodide since last date. Urine normal. *July 9, 1879.* Began to take iodide three days ago. Urine pale and faintly acid. Iodine reaction. No albumen. A few *mucons* tube-casts. *25th.* Urine pale. Iodine reaction exceedingly feeble. No albumen. Triple phosphates in abundance. Swarms of vibrios. After diligent search, a single hyaline cast is discovered. *Oct. 1.* Has taken no physic for some time. Urine normal. *March 1, 1880.* No physic. Urine healthy.

CASE 6.—Sarah W., coloured; syphilitic for five years. Has had various systemic manifestations. Much "rheumatism." Has now plithisis pulmonalis. Has been taking mercury, iodide of potassium, and cod-liver oil. *March 6, 1878.* Urine shows presence of iodine; sp. gr. 1013. Albuminuria. Hyaline and granular tube-casts. *April 17.* Urine pale and acid; sp. gr. 1010. No iodine reaction. Albumen present in large quantity. Pale and coarsely granular tube casts. This woman had a large cavity in the apex of her right lung, and had been anasarcaous.

CASE 7.—M. G., white, about 50 years old. Twenty years syphilitic. During this period has suffered from many forms of constitutional manifestations. Has been hemiplegic for several years. Last summer she took thirty-grain doses of iodide of potassium thrice daily. Is not at present under treatment. *March 6, 1878.* Urine very pale, alkaline; sp. gr. 1010. No iodine reaction. Albuminuria. *April 17.* Urine pale, faintly acid; sp. gr. 1006. No iodine reaction. Small amount of albumen. Hyaline and pale granular casts present.

CASE 8.—Kate M., negress, aged 46 years. Syphilitic nearly twenty-four years. Has had various eruptions and very much "rheumatism." Much headache, nausea, and vomiting. Has had dropsy. Heart normal. She is very obese. Has been taking iodide of potassium for twenty-five months. Now takes ten grains thrice daily. *April 2, 1878.* Urine pale; sp. gr. 1023. No iodine reaction (!). No albumen. Lozenge crystals of uric acid, and *mucons* tube casts. Likewise a number of hyaline and pale granular tube casts. *17th.* Urine, acid; sp. gr. 1022. Iodine reaction. A barely perceptible amount of albumen is present. Uric acid crystals and hyaline and pale granular casts.

CASE 9.—Lottie L., coloured, 29 years old. Syphilitic for several years. Cachectic. Broad condylomata of perineum. Also of vulval and anal regions. Enormous hypertrophy of left labium majus and clitoris, equalling a cocoanut in size. Has been taking iodide of potassium for some time. At present has twenty grains thrice daily. *March 31.* Urine acid; sp. gr. 1011. Considerable pus present. Albumen in limited amount. Iodine reaction. Hyaline tube casts. Nausea and dyspepsia trouble her greatly. Has never had dropsy. Heart healthy.

CASE 10.—Annie B., 25 years old. Syphilitic ten years. Various constitutional manifestations, and extensive ulcerations. Several years since, her left leg was amputated, in consequence of intractable ulceration and necrosis. Has had much iodide of potassium, and is now taking 20 grains thrice daily. *April 2.* Urine straw-coloured, acid; sp. gr. 1016. Iodine reaction. Copious amount of albumen. Multitudes of hyaline, pale, and coarsely granular tube-casts, some studded with renal epithelium and

blood disks, some fatty. 17th. Urine acid; sp. gr. 1012. No iodine reaction. Highly albuminous. She has at several times been anasarcaous, not so at present. Heart hypertrophied; valves normal. Casts not coloured by solution of iodine.

CASE 11.—John P., 21 years old, sailor. Syphilitic since 1872. Sore throat; iritis; "rheumatism;" periostitis. Has had various skin manifestations. Has taken iodide of potassium for seven weeks, never before. May 1, 1878. Urine high-coloured, acid; sp. gr. 1023. Iodine reaction. No precipitate to heat and nitric acid. No tube-casts present, but large numbers of oxalate of lime octohedra. 28th. Urine acid; sp. gr. 1030. Iodine reaction. Oxalate of lime octohedra of very minute size. A goodly number of mucous casts, and a few well-defined hyaline tube-casts. June 10. Urine acid; sp. gr. 1027. Iodine reaction. No albumen. Careful search through several slides reveals, in addition to oxalate of lime, octohedra and mucous casts, a single hyaline tube-cast. 16th. Urine acid. Iodine reaction. No albumen. Mucous tube-casts. No crystalline deposit. No hyaline casts. This patient had no history of dropsy. His heart was healthy.

CASE 12.—B. F. T., coloured, sailor, 25 years old. Syphilitic for four years. Frequent and various cutaneous eruptions. Iritis. Has had suppurative adenitis. Has been taking iodide of potassium for one year; now takes 10 grains thrice daily. May 18. Urine acid; sp. gr. 1020. Iodine reaction. No albumen. Microscopically, a few pus-cells and hyaline tube-casts, also a few pale granular casts. 26th. Urine acid; sp. gr. 1023. Iodine reaction. No albumen. Hyaline and pale granular tube-casts. June 1. Urine acid; sp. gr. 1030. Iodine reaction. No albumen. The microscope reveals only a few oxalate of lime octohedra. 16th. Has taken no iodide for several days. No iodine reaction. No albumen. No tube casts. Octohedra of oxalate of lime. 25th. Urine acid. No iodine reaction. No tube-casts. Oxalate of lime crystals. July 2. Has been taking iodide of potassium for one week. Acid urine; sp. gr. 1028. No albumen. Microscopically, a few oxalate of lime octohedra and many hyaline and granular tube-casts. (No history of dropsy.)

CASE 13.—J. M., white, sailor, 30 years old. Initial lesion twelve years ago. Various cutaneous affections. "Rheumatism." Iritis. Has been taking 10 grains of iodide of potassium thrice daily for five months. May 18, 1878. Pale and acid urine; sp. gr. 1017. Iodine reaction. No albumen. Some hyaline tube-casts are visible. 28th. Urine acid; sp. gr. 1022. No abnormal deposit. June 1. Urine acid; sp. gr. 1022. No albumen. No iodine reaction. No abnormal microscopic condition. June 16. Urine acid. Iodine reaction. No albumen. A number of sharply defined hyaline tube-casts. (He had not been taking iodide for nearly a month, but upon a recurrence of iritis, its use was resumed several days ago.) 25th. Urine acid. No albumen. Iodine reaction. Well defined and perfectly hyaline tube-casts.

CASE 14.—S. J., negro, 23 years old. Initial lesion in March, 1873. Copious general eruptions, alopecia, ulcerative lesions, pulmonary hemorrhages, dulness over right apex in front and behind. (Oct. 1877.) June 13, 1878. Pulmonary softening and cavities. Very pronounced general adenopathy. Urine pale, alkaline; sp. gr. 1020. No iodine reaction. Large amount of albumen. Microscopically, triple phosphates, but no tube-casts. 15th. Urine pale, alkaline. Albumen present in smaller amount. Many pus-corpuscles. No tube-casts.

CASE 15.—J. B., sailor, 32 years old. Initial lesion during the spring of 1872. Has now (July 14, 1879), ulcers upon legs, and many scars upon back, breast, and legs. The entire back is covered with scar-tissue forming an immense surface of cicatricial bands and depressions, the colour of which still shows the dusky red of recent repair. He took some iodide of potassium in 1874. Takes at present 4 grains, with $\frac{1}{8}$ gr. of bin-iodide of mercury thrice daily. Urine acid; sp. gr. 1020. Iodine reaction. No albumen. Associated with minute oxalate of lime octohedra and pus-cells, there are quite a number of casts of the tubules, some mucous, others ordinary pale granular casts, which are very numerous. *July 29.* Has taken no iodide for two weeks. Urine acid; sp. gr. 1022. No albumen. No iodine reaction. No tube-casts. Some oxalate of lime octohedra. *Aug. 6.* Urine acid; sp. gr. 1008. No iodine reaction. No abnormal deposit. No albumen.

CASE 16.—F. J. K., 45 years old, paperhanger. Initial lesion twenty-five years ago. Symptoms of varied character since that time. Has now deep ulceration on breast and abdomen. Some œdema of lower extremities. Line of hepatic dulness reaches below the level of the umbilicus, but recedes rapidly towards the left. Patient very thin and sallow, but not distinctly jaundiced. Some ascites. Girth at umbilical level 84 cm. General health much reduced. Has had paralysis of eye muscles. Can give no account of treatment, except of a profuse salivation. Takes now 8 grains of iodide of potassium thrice daily. *July 21, 1879.* Urine acid; sp. gr. 1006. Iodine reaction. Small quantity of albumen. No tube-casts. *23d.* Urine pale and acid; sp. gr. 1010. Copious precipitate of albumen, and, microscopically, abundant tube-casts, granular and epithelial. Iodine reaction. *Aug. 5.* Urine acid; sp. gr. 1008. Iodine present. Much albumen. Hyaline tube-casts in small numbers. *Sept. 9.* General condition much improved. Ulcers healed. Urine albuminous and with hyaline and granular tube-casts. Heart enlarged, but valves healthy.

CASE 17.—H., sailor, 30 years old. Chancre five years ago. Various constitutional symptoms, but no ulceration. Right hemiplegia and aphasia for two months. Improvement under the iodide of potassium. *Aug. 6.* Urine not albuminous; acid; sp. gr. 1022. Copious deposit of oxalate of lime octohedra, and many hyaline tube-casts. *9th.* Urine pale. Not albuminous. Iodine reaction. No tube-casts. Has not been taking iodide for several days. *Sept. 5.* Iodide resumed. Urine shows iodine reaction; acid. Mucous and hyaline tube-casts and oxalate of lime octohedra in small numbers. *23d.* Urine acid; sp. gr. 1010. Iodine reaction. No albumen. No tube-casts. *Oct. 22.* Urine free from albumen and tube-casts, but with oxalate of lime in small quantity. Heart normal. No dropsy.

CASE 18.—An elderly sailor, wretchedly emaciated and with pronounced cachexia, just from shipboard. Unable to stand. Can give no history. Body is seamed with white flat scars. Breath disgustingly fetid from deep faucial and pharyngeal ulceration. Large nodes upon right radius and ulna. No dropsy. Vomiting incessantly for several days. Death in three days apparently of exhaustion, without paralysis and with intellect clear to the last. Urine, examined day of admission (*Aug. 13*), was acid, of sp. gr. 1014. Small amount of albumen. Plenty of tube-casts, mucous, hyaline, and granular. *Post-mortem examination:* Kidneys dark brown. Capsules moderately adherent. Left kidney much smaller than right. Both hard and contracted, but without circumscribed alterations.

No signs of gummy infiltration in any part of abdominal cavity. Upon the spleen, which was slightly enlarged, there was a flattened, whitish mass of cartilaginous hardness, lozenge-shaped and measuring 3×2 cm.

CASE 19.—B. R. Ostler; Irish; married. Chancre in Jan. 1876, followed by severe constitutional symptoms. Oct. 15, 1879. Deep ulceration of right leg. Left testicle as large as a hen's egg, smooth, evenly enlarged, and painless. Patient is a large, burly man of dissipated habits. Urine acid; sp. gr. 1020. No albumen, but numerous hyaline and granular casts of the tubules. Begins to take iodide of potassium in 5 gr. doses thrice daily. Dec. 13. Urine free from albumen and tube-casts. Abundant uric acid crystals and oxalate of lime. 22d. Still takes iodide. Urine not albuminous. Copious deposit of amorphous urates and a few hyaline and granular casts.

Thus, it will be observed that of 70 cases investigated by me, 19 betrayed evidences of renal disturbance; 13 being characterized by the presence of albumen in the urine, constantly or at irregular intervals, while in 18 the microscope revealed, in the urine, casts of the renal tubules. In 12 cases albumen and tube-casts were simultaneously present. It is at once manifest that the kidneys were affected in very different degrees in the different cases. In few instances were the evidences of kidney disease pronounced and constant. For the most part, they were slight and transitory, and my observations are remarkable rather for the large proportion where renal disturbances were detected, than for their gravity. For the present, I propose to turn aside from many of the interesting features of these cases, and to ask attention to the influence that may possibly have been exerted by the iodide of potassium in the production of abnormal conditions. For the purposes of such an investigation, a certain number of my cases may be excluded, as offering examples of pronounced renal degeneration, the exciting cause of which was buried in obscurity, and others, where the changes, though slight, existed already when first coming under notice, and before the iodide of potassium was administered. Similarly, must be excluded those cases where the albumen or tube-casts, or both, though irregularly and transitorily present in the urine and perhaps in some instances dependent upon the iodide of potassium, could not with any show of probability be traced to the ingestion of this drug.

Before proceeding to consider the cases where iodide of potassium did seem to exert an influence in exciting the morbid symptoms, let me briefly call attention to the very large proportion of cases where oxalate of lime crystals will be found in the urine of persons taking the iodide. Thus, of a series of observations of 81 cases, oxalate of lime crystals (usually in abundance, sometimes scantily) were detected in 21 cases. The urine of these 21 patients contained lime oxalate octohedra 39 times; and in 29 of these observations the simultaneous presence of iodine was ascertained. Although we may no longer accept the views of Golding-Bird and Prout concerning an oxalic acid diathesis or oxaluria, but must consider the condition simply as a manifestation of lithiasis, a result of imperfect oxidation,

we may still in the present instance fairly assume that this incomplete oxidation is in some manner the result of the influence of the iodide of potassium in disturbing the digestive processes, or otherwise interfering with normal nutrition and metamorphosis.

The cases coming under my observation, where inconsiderable disturbance of the renal organs was associated with the administration of the iodide of potassium, have been, as I have shown, proportionally numerous. In only a few was it possible to attribute to the drug, with any degree of confidence, a causative influence in exciting the derangement. Simply asking attention, therefore, to the frequent association of evidences of renal irritation with the presence of the iodide of potassium in the circulation, I pass to the consideration of those cases where the iodide of potassium seemed to determine the abnormal condition of the kidneys. Case 5, for example, had been taking the drug for some weeks previous to my first observation, when albumen in small amount and hyaline and granular tube-casts were discovered. Shortly after the medicine was discontinued, the albumen disappeared from the urine, but it was not until the expiration of four months that the urine became perfectly normal, so far as concerns the presence of tube-casts, as shown by several examinations extending over a period of six months. My patient was not again seen for an additional six months, when the urine, examined three days after resuming the use of the iodide, revealed only mucous casts. Three weeks subsequently, diligent search revealed a single hyaline cast. Treatment was again suspended, and at the expiration of two months the urine was normal, as far as concerns albumen and tube-casts; and so it remained at the end of another six months. Case 12 likewise justifies to a great extent the suspicion that renal irritation, resulting in the formation of tube-casts, followed the ingestion of the iodide. This patient had been taking the remedy nearly one year. Albumen was not detected in the urine, but a number of hyaline and pale granular casts were discovered. A week later a similar condition was ascertained. Four days later the urine appeared normal, the ingestion of the iodide having been discontinued. The medicine was not renewed for a month, during which time the urine was twice examined and found healthy. A week after the treatment was recommenced, many hyaline and pale granular casts of the renal tubules were detected, but no albumen. Case 13 presents features showing the same tendency. The patient, a sailor 30 years old, had been twelve years syphilitic. He had been taking iodide of potassium in ten-grain doses, thrice daily, for five months. His urine, examined May 18, was acid, of sp. gr. 1017, and contained iodine. There was no albumen, but hyaline casts were present. *May 28.* Urine healthy. *June 1.* Urine without iodine, albumen, or tube-casts. *June 16.* (He had not been taking iodide since the middle of May, but upon the supervention of a new attack of iritis it was resumed several days previous to this date.) The urine was without

albumen, but contained iodine and a goodly number of well-defined hyaline tube-casts. *June 25.* Urine acid. No albumen. Iodine reaction. Well defined hyaline tube-casts. Case 15 also seemed to exhibit renal irritation from the ingestion of iodide of potassium. He had late syphilis and was taking four grains of iodide of potassium thrice daily. His urine contained hyaline and granular tube-casts, but no albumen. His iodide was stopped for three weeks. His urine, examined at the end of this period, showed no iodine reaction, no albumen, and, microscopically, no tube-casts. Examined again after a week, it remained free from abnormal appearances.

The following cases, abstracted from my note-book, though not included in the regular series of observations, on account of the recent date of the acquirement of syphilis, and not occurring in order, are of especial interest, as bearing upon the point under discussion:—

CASE 20.—S. F. B., a young negro, hostler, had a chancre of the penis about Christmas, 1877. April 6, 1878, he had a copious pustular syphiloderm, and complained of very extensive “rheumatism.” For this he had been taking, for a few days, the iodide of potassium. His urine, examined on the above date, was acid, of sp. gr. 1022, and showed the presence of iodine to the test. There was no deposit to heat and nitric acid; no tube-casts. The treatment was continued more or less regularly until June 6, when the urine was straw-coloured and acid. The presence of iodine was ascertained; there was no albumen; crystals of uric acid and oxalate of lime were detected, and with them well-marked hyaline tube-casts. He now ceased to take the iodide, and his urine, at the end of two weeks, contained neither albumen nor tube-casts. The iodide was not resumed, and the urine examined July 9, 1878, Jan. 7 and 15, 1879, remained perfectly healthy.

CASE 21.—James W., Irish, 32 years old. Had a chancre during the latter part of Sept. 1877, followed by extensive papular syphiloderm. His urine, examined Jan. 15, 1878, was pale, of acid reaction, and of sp. gr. 1022. Albumen was not present, and the microscope revealed no signs of renal disease. Nodes beginning to appear on the tibia, accompanied by excruciating nocturnal pains in the knees, the iodide of potassium was now ordered, and was continued irregularly until March 28, with, for short intervals, a small amount of mercury. At the latter date his urine was pale, faintly acid, of sp. gr. 1028, and was free from albumen. There was a slight sediment of oxalate of lime octohedra, and some mucous tube-casts. The iodide was continued until early in May. The urine examined May 20 was without iodine reaction, but contained a small amount of albumen and numerous hyaline and pale granular tube-casts. The patient remained irregularly under treatment for some months longer, and then was not again seen until Sept. 4, 1879, when he had taken no medicine for a considerable time. His urine was free from albumen and tube-casts.

Although, in the greater number of my cases, no definite connection between the iodide ingested and the albumen or tube-casts found in the urine could be established, the occurrence of the latter was unexpectedly frequent, and out of all proportion to what is usually supposed to prevail. It is true that the number where pronounced renal disease was present was

probably not much larger than will often be found in the wards and out-patient departments of large city hospitals. The point to which I especially desire to call attention is, that in so many of my patients albumen or tube-casts, or both, were detected, chiefly, however, as transitory phenomena, the former in minute quantity, the latter in the forms indicative of the smallest amount of renal alteration.

The question arises here, very naturally, of the significance of the presence of albumen in small quantity and of hyaline casts of the renal tubules in the urine. So far as concerns the albumen there seems to be no reason to believe that it is present in healthy urine, or to doubt that the presence in the urine of even a small amount indicates a departure from health. "We must admit, however, that it may make its appearance under such conditions as to show only a very slight deviation from the natural state." (Ellis, *Boston Med. and Surg. Journ.*, vol. cii., 1880, p. 361.) So far, then, as albumen was present in the urine of these patients, we may conclude that it was as a result of pathological processes. In quite a number of the cases, however, hyaline and pale granular tube-casts were the sole evidences of a morbid condition of the kidneys. I have already referred to the unusual frequency of oxalate of lime-crystals, and their probable dependence upon the ingestion of the iodide of potassium. Should the same influence determine the appearance of the tube-casts, to what extent may these be considered to be the results of tissue change? In other words, may hyaline casts of the renal tubules be found in the urine of persons whose kidneys are healthy?

It has not unfrequently been asserted that hyaline tube-casts may appear in urine from healthy kidneys. Henle, for example, claimed to have frequently discovered them in healthy kidneys. (*Handbuch der Systemat. Anat. der Mensch.*) Charcot also states that they may appear in the urine when the kidneys are not diseased, and says that the same assertion has been made by Robin, Axel Key, and others (Tyson, *Phila. Med. Times*, vol. x. p. 293). Nearly all authorities, however, consider the presence of tube-casts, of any variety (except, possibly, the mucous), as indicative of morbid change in the kidneys. Bartels declares (*Ziemssen's Cyclopædia*, vol. xv.) that true casts are never found under normal conditions, and that as a general rule they are attended with the excretion of albumen (p. 87). It seems to be pretty certain that hyaline casts of the renal tubules are the results of irritation of the epithelia of these tubules, in consequence of which a coagulable material is secreted by these cells, which coalesces into cylinders, corresponding to the shapes of the tubules. (*Aufrecht. Centrabl. f. d. Med. Wissensch.*, 19, 1878; Langhaus, *Virchow's Archiv*, lxxvi. 85, Oedmanson, Rovida, and others.)

To what extent these casts may be evidences of tissue alterations it is impossible to say. It is certainly reasonable to suppose that at least they may be results of transient irritation that may subside without leaving

its vestiges behind in the tissues of the organs. There can be no doubt that patients suffering from acute febrile disease may, during life, pass urine containing both albumen and tube-casts, and yet the kidneys of these persons may reveal nothing abnormal after death. This would simply indicate that the irritation that was sufficient to stimulate the glandular epithelium to the formation of casts, was not violent enough or sufficiently long continued to produce recognizable structural alterations. It must, therefore, be understood, that the influences producing these casts may vary from a slight stimulation of the epithelia of the tubules to extensive and irreparable destruction of renal substance; but it must not be forgotten that while an insignificant and transient irritation may subside without leaving its traces behind it, it is most probable that if it be continued for an indefinite time it may finally produce permanent effects. In the cases I have recorded, the results from the irritation of the iodide were, as observed, at most slight albuminuria and pale granular tube-casts. Nor was there noticed, in any of them, systemic evidences of renal disturbance. Certainly in no case was there the slightest reason to suspect, as produced by the iodide, an extensive parenchymatous inflammation, such as it has been claimed the iodide is capable of exciting. The effects were such as iodine and the iodides may occasion in mucous membranes generally, a catarrh, in fact. Beyond this it did not proceed, but, on the other hand, there seemed rather to be a tendency towards a subsidence of the irritation and a toleration of the drug. At least, there seemed to be no increase in the symptoms under its use, and in one case especially, that of K. G. (Case 4), the renal affection that had been quite pronounced, gradually and completely disappeared under the full and systematic use of the iodide. It is not impossible, however, that in this instance the results were due to the specific action of the drug upon a purely syphilitic renal disorder.

At the same time, I cannot avoid the conclusion that while the evil effects of the iodide of potassium upon the kidneys are small and for the most part transitory, the occurrence of more severe alterations is not impossible, nay, is probable. But upon this point my investigations have been too few and imperfect to enable me to speak with confidence. It is perfectly well established that there is no constant tendency on the part of the kidneys to resent the presence of the iodide. My own observations are confirmatory of this, for they include a number of old syphilitics, to whom the drug had been administered for protracted periods, and in excessive doses, without the smallest sign of urinary disorder. As in other parts of the body, the undesirable effects of the ingestion of iodine and the iodides have been attributed to idiosyncrasy, so must idiosyncrasy be invoked to explain any undesirable results of the action of these preparations upon the kidneys.

ARTICLE II.

USE OF THE ÉCRASEUR FOR CURING DEEP-SEATED FISTULA IN ANO. By
J. M. F. GASTON, M.D., of Campinas, Brazil.

THE frequency of fistula in ano has its origin in some ill-defined proclivity on the part of the tissues about the rectum to a subacute form of inflammation. A proneness to the development of abscesses in this region may be explained by the turgescence of the abundant supply of blood-vessels connected with a want of proper evacuation.

The rectum being the receptacle of the excrementitious mass resulting from the materials that constitute our food, may be irritated by the long continuance of the indurated feces in the canal. It is also liable to injury by the passage of foreign bodies that have been swallowed, and that have rough or very irregular surfaces which offend the mucous membranes.

A purulent discharge from an inflammation exterior to the walls of the rectum, that finds its way outside of the sphincter ani, is not often attended with serious consequences. The source of trouble that terminates in fistula is generally an abrasion or pustular inflammation involving the lining membrane and the adjacent areolar tissue of the canal, by which the vitiated fluids penetrate the cellular tissue, and permeate the surrounding muscular substance. A tract or channel is thus formed which is destined sooner or later to reach the surface externally at varying distances from the anus. If the origin is near the outlet of the rectum, the point of discharge externally will usually be found immediately outside of the sphincter ani. But if the source of the fistula is high up in the canal, the route of the discharge may be in the direction of the sacrum or through the muscular fibres of the gluteus, and there may be several lines of communication with the surface. A single opening by the ulceration of the mucous membrane of the rectum may cause a fistula that diverges in different channels, and thus permeating all the tissues, finds several outlets at various points over the sacrum or on the buttocks. As a rule, when fistulous tracts are formed superficially over the sacral or gluteal regions, there will exist an ulcerated opening in the lining membrane of the upper part of the rectal canal. But it happens occasionally that we are unable to trace this connection, and perhaps in some cases the internal lesion has cicatrized while the outer fistulous tract continues. In a case that was under my care some time since for fistulous discharges over the sacrum, in a vigorous young Brazilian, I laid open the superficial communicating channels with the knife, and found in one of them a pledget of short hairs of an oblong shape, which had an unmistakable fecal odour. I expected from this to be able to trace a communication with the rectum, but no connection could be discovered, and the crucial fistula that was laid open closed by granulation, and gave no further trouble.

Another serious case of extensive superficial fistula is under my observation at present, and has prompted me to prepare this paper.

CASE I.—There were four extensive tracts over the posterior gluteal region, being two on either side of the sacrum, communicating each with its fellow, but not apparently connected with those of the opposite side. The two on the right side, being on the posterior aspect of the hip, were laid open with the bistoury and grooved director ten days since, while the two on the left hip have remained for another operation when the former shall have made some progress in granulating. In them it has been requisite to draw the gaping skin together by adhesive plaster for the advancement of the healing process, which has been proceeding regularly thus far with dressings of lint and carbolized oil.

In the tracts already laid open no communication was detected with parts more deeply seated, yet it may be that upon making the incision of the fistula over the left buttock the line of communication with the rectum may be found. Upon exploring the rectum indications of former ulceration were discovered high up in the canal, and the posterior wall gives evidence of a cicatrization, with adherence to the promontory of the sacrum. It is hence clear that this was the focus from which the fistulous tracts were extended to the superficial parts of each hip, and it is not improbable that there may still exist a small orifice by which the secretions escape from the rectum, and keep up the irritation along the lines of communication with the external outlet. Although the cicatrization in the upper posterior part of the canal indicates that an orifice existed previously, and has been obliterated, the examination within does not reveal a lesion of the mucous membrane at present, and the final result will enable us to determine the mooted question as to the spontaneous closure of the internal opening of a rectal fistula while the external outlet keeps up a discharge of pus.

This patient is a young negro man, who has done the ordinary service of a slave upon a coffee farm, and has doubtless received nourishing food, but has not had that variety in those plain articles which his condition demanded for alimentation. There exist over the region of the clavicle several patches of ulceration which indicate a scrofulous diathesis, yet they are improving under the influence of cod-liver oil and generous fare so that the restorative process in the incision is going on very favourably, yet the general condition of the subject is not altogether satisfactory for the good result of an operation on a large scale.

The other superficial tracts will be laid open with the knife as those have been; yet should it turn out that some of them have a connection with the canal of the rectum, it may be requisite to separate the deep-seated tissues with the chain of the *écraseur*, and hence I have introduced a notice of this case as a preliminary to the description of those which have been operated upon by this instrument.

It is not necessary that the *écraseur* shall be used to perform simple operations that may be suited to the employment of a bistoury and grooved director, or to the use of gradual constriction by the loop of a cord or wire. The fistulæ, which originate immediately within the anus and terminate at a short distance outside of it, may be divided so safely and expeditiously with the knife as not to require the use of an anæsthetic, and should the

patient insist upon lessening the pain of cutting, local anæsthesia will serve the purpose without the risk or delay of inhalation.

The whole subject of fistula in ano affords an interesting field of investigation, and there is much for study in the improvements which have been effected in the mode of treating the various forms of this troublesome affection. But, as I am limited to a notice of one important branch of the subject, this paper does not include those phases of the disorder that are most frequently encountered by the practitioner.

It has happened that a large variety of these fistulous affections about the rectum have come under my observation here within the past ten years, and it has been noted that the cases of gravity are far more frequent in this place than in the Southern United States, where an extensive field of observation afforded few cases in comparison with those I have encountered in Brazil. Some of the cases that form the basis of this paper have occurred in the practice of other physicians with whom I have co-operated in their management, or in the necessary operations, while a considerable number have been under my own care. It is not my purpose to present any statistical record of the different kinds of fistula in ano that have been treated; but, putting aside the more familiar examples of simple cases, such details will be presented as may give a proper conception of the graver varieties that have come under treatment. Not treating of cases in which palliatives are to be used, nor of the more simple operative procedures for the cure of ordinary fistulæ, no reference need be made to those examples, and hence attention is directed only to the class of deep-seated fistulæ which are appropriate for the application of the écraseur.

The principle upon which this instrument acts allows the use of a cord, wire, or chain to constrict and in the end divide the tissues, which are inclosed within the loop. Having employed the jointed chain formerly with satisfactory results in the excision of hemorrhoidal tumours, preference was given to it for dividing the parts that intervened in fistula. When the tract or channel penetrates to such a depth as to cause apprehension of hemorrhage by cutting with the knife, the tissues may be divided without any risk by the chain of the écraseur of Chassaignac. The instrument should be tightened up to the point of dividing the cellular tissue and muscular fibres, and, even when an extensive mass is divided, no bleeding occurs. The chain may pass high up into the canal of the rectum, where there are vessels which would bleed profusely from an incision with the bistoury, and yet no hemorrhage ensues upon their division by the chain of this instrument.

The essential conditions which indicated very clearly this operation have been presented in three cases of extensive fistula in ano, in which there was such correspondence in the history of the individuals as to be types of the uncomplicated rectal disease.

The patients were active, robust, and otherwise healthy persons, so that the affection could not be attributed to any constitutional disease, but was most probably the result of some local injury or ulceration of the mucous membrane of the canal immediately below the contraction of the circular fibres which serves as a division between the sigmoid flexure of the colon and the rectum; or, in other words, near the internal sphincter which ordinarily retains the excrementitious matter within the lower part of the intestine. The internal opening in each case was high up in the rectum, and the fistula extended from this aperture deeply into the surrounding tissues, so that the tracts or channels lead out in one case over the sacrum, and in the other two reached the lateral aspect of the buttocks. The line of communication between the internal orifice and the external outlet of the fistulas, in each of the three cases, exceeded six inches in length.

CASE II. was an athletic, middle-aged man of German descent, but a native of Brazil, who led an active life as manager and part owner of an extensive machinery establishment. CASE III. was an able-bodied negro man, about twenty-five years old, who laboured upon a coffee fayenda. CASE IV. was a robust black woman, of perhaps thirty years of age, whose service had also been in the coffee-field.

With all the antecedents of nourishing food and exercise in the open air, each of these cases developed extensive fistulæ without any material impairment of their general health, and afforded most favourable conditions for an operation involving the deep-seated tissues.

It may be stated in advance that in all these extensive divisions of the muscular fibres the subcutaneous injection of morphia, with the inhalation of chloroform, has been resorted to previous to operating, and a full dose of sulphate of quinia has been given subsequently, thus preventing the suffering and consequent shock to the general system of the patient.

In Case II. the fistulous openings were connected by channels that crossed immediately over the upper middle part of the sacrum, and when these were laid open the incisions presented two lines of 4 x 6 inches at right angles in their middle point so as to form a cross. This division was effected with the bistoury and grooved director, extending to every depression that could be reached, and yet without discovering any aperture by which to trace a communication with the lesion that had been found in the rectum. This difficulty caused a postponement of the final operation until the close observation daily of the fistulous surface now exposed to view revealed the exact site of the orifice.

It may not appear impertinent to remark that all fistulous channels over the region of the sacrum and ischia, even when they appear to be superficial, should be suspected to have their origin in the rectum, and are to be explored with great care to locate the point of entrance. The opening may exist in any part of the superficial tract, and after the fistulous channel is opened it may prove impracticable to pass a probe into the orifice, though there may exist a lesion high up in the rectum, which indicates that a communication should be found. A little patient watching, as in this case, will generally be rewarded with success.

Having determined with accuracy the orifice of the fistula and the line of its communication with the upper part of the rectum, the chain of the écraseur was secured to an elastic bougie and thus drawn into the tract of the fistula, passing out of the rectum through the anus. This extremity

of the chain being joined with the other, which remained outside of the orifice on the right side of the sacrum, they were both attached to the instrument. Thus it will be seen that all the tissues contained in the great sacro-ischiatic notch were included in the loop of the chain attached to the écraseur. It was cautiously and gradually tightened until every portion of the substance, in which the sphincter ani entered, was entirely divided, and without any hemorrhage. Such a chasm has not perhaps been made previously into the canal of the rectum as was caused by the passage of the chain of the instrument through the large mass of the cellular and muscular tissues adjacent to the sacrum and the coccyx on the posterior aspect of the right buttock. This immense wound was filled up with fine strips of old linen (which I prefer to lint in these cases), previously saturated with carbolic oil, and the dressings were daily renewed to the great discomfort of the patient, as there was such an extensive raw surface exposed. At the end of one month very considerable progress had been made toward the restoration of the divided parts, and within three months all was completely healed. The only trouble that remained was some lack of retentive power on the part of the sphincter ani, which was so far relieved at the end of twelve months that only when there were fluid evacuations was any difficulty experienced. Five years have elapsed since this operation, and the gentleman has been actively employed since the close of the first year without further inconvenience locally or generally.

CASE III. presented quite a number of fistulous openings over the posterior aspect of the buttocks, and it was at first suspected by another physician who examined the case that they resulted from brutal chastisement of the slave, though there was no allegation to this effect. But upon examining the rectum the origin of the trouble was detected in the upper part of this canal, and the tracts extended from this in different directions to the surfaces over the sacrum and the ischia, involving the right and left buttocks. It was ascertained that the smaller superficial channel of some three inches in length could be divided safely with the bistoury and the grooved director that was passed on the posterior part of the left buttock. The other two extensive tracts involved tissues that would have caused bleeding if the division had been with a knife, and hence it was most expedient to use the écraseur. The chains of two instruments were passed through the respective channels and out at the rectum, in the manner described for the previous operation, and the division of both was effected at the same time without any loss of blood.

In Case II. the large gaping wound, resulting from such an extensive solution of continuity, presented something considerable for the healing process. But in this second operation there were two incisions quite as deep, and one of them of greater length; while the third made with the knife, though less, would have been important but for the immensity of the others. There were two superficial fistulous tracts, communicating laterally with the main channels, which were left for treatment by the use of injections, and they were cured while the dressings were applied to the grand chasms with strips of linen and the carbolic oil.

In this operation the rectum, including the sphincter ani, was laid open to within a half inch of the ring of circular fibre that divides this canal from the colon and implicated all the sacro-ischiatic spaces, which corresponded very much to the second case. But independently of this there was a far more extensive division of the soft parts, making with the former something less than a right angle outwardly in the huge mass of the right

buttock. This last was divided much after the manner that a butcher would proceed in getting out a rump steak.

Even to the professional eye it was a hideous sight, and there seemed scarcely a hope for the restoration of this vast destruction of substance; yet the curative powers of Nature asserted themselves in a most satisfactory manner, and in less than twelve months this negro returned to his ordinary work on the plantation entirely well, having complete control over the sphincter ani. He was operated upon three years ago, and for the past two years has not required any professional attention.

CASE IV. had two deep fistulæ, whose external outlets were nearly equidistant from the junction of the sacrum and coccyx on either side, having each a communication with an opening about midway up the rectum. The channels being tortuous could not be traversed by a metallic probe or director, yet they were explored by a flexible bougie, to which the chain of the écraseur was attached, and thus loops were thrown round the intervening parts. Two instruments were used so as to encircle the tissues on either side and divide them at the same time. As the chains included a portion of the buttock that contained no vessels that could yield any considerable amount of blood, the tightening of the screw in the one and the working of the handle in the other instrument were done rather too fast, and, as a consequence, there was some sanguineous oozing from the divided surfaces of the muscles. This, however, ceased upon the application of a strong aqueous solution of phenic acid, which has proved in my hands an effective hemostatic, even when small arterial twigs are divided by the knife.

The usual dressing of fine strips of old linen saturated with carbolized oil was kept up for some weeks, and the cure was completed within two months, so that the negress went about her duties on the farm.

The most remarkable feature in connection with these extensive divisions of the deep-seated fistulas, involving the cellular tissue and the muscular fibre surrounding the rectum, is the comparatively slight effect produced upon the general system. There has been very little febrile excitement after any of these heroic operations, and the restorative process has also progressed very satisfactorily in all three cases.

Trusting that my record of these operations may induce others to present their experience in the management of deep-seated rectal fistulæ, I have great confidence in recommending the écraseur to the favourable consideration of my colleagues when they have to deal with these grave cases. The advantages of this simple instrument are so evident as only to require a knowledge of the immediate and final good results of its application in such operations, that it may be appreciated by surgeons generally.

I make no reference to the hopeless cases that have come under my observation for which no remedial step was undertaken because of the general prostration, and not from any apprehension of the consequences of arresting the fistulous discharge. I will be excused by those who are most experienced in the treatment of these disorders of the rectum for not adopting the idea of former times, that the drain thus induced upon the adjacent parts has a salutary influence upon tubercular disease of the

lungs or upon chronic affections of the liver. The evidence is conclusive to my mind that the general debility and constitutional irritability resulting from the constant wear and tear of fistulas involving the tissues surrounding the anus, are in most cases aggravating circumstances in the progress of other diseases, and the sooner and the more effectually they can be cured the better for all the disorders of the animal organization. Being advised of the position taken by Brodie, Astley Cooper, Theophilus Thompson, Druitt, Chelius, and others, in opposition to the radical cure of fistula in ano which occurs in the course of organic disease of the lungs or liver, I cannot acquiesce in the view of these high authorities and set aside the experience of other observers equally entitled to consideration. It may be held that distinguished names of our day are marshalled against operating under such conditions, and amongst them stands out bold and prominent that of the sagacious Dr. Gross.

"All attempts," he says, "at a radical cure are, of course, inadmissible when there is serious organic lesion in other parts of the body, especially the lungs. To avert the local irritation would, in such an event, prove highly detrimental by expediting the fatal crisis. Palliation alone, not cure, is sought; or cure, slow and chronic, occupying months instead of weeks, in its accomplishment."

This *ipse dixit*, coming as it does *ex cathedrá*, must be weighed with facts. However great may be our respect for the professional opinion of such an erudite author, it is evident that holding this view in regard to therapeutic indications in this pathological state of the system, he could not, from the nature of the case, be supposed to have put the matter to a practical test. It must be inferred that he has based his statement upon a preconceived impression derived from those who have heretofore given judgment in a case of fistula in ano that is connected with some other organic disease unfavourable to any operative procedure that looks to a radical cure. It is thus at best but negative testimony, which may be set aside by positive results.

The "chronic cure," which is recommended in the event of using any remedial measure, so as to spare the physical strength of the patient, reminds one of lessening the shock to the dog by taking off his tail by piecemeal, an inch at a time, instead of removing it all at one stroke of the knife.

Thus the slow treatment suggested for the fistula in ano of the subject of hepatic or pulmonary disease must operate upon the delicate organization of the tissues about the rectum, making the oft-repeated impressions of these temporizing applications, instead of the speedy and efficacious effect of a single and well-directed operation in cutting short the entire train of disorders.

No one would expect any advantage from resorting to a surgical operation for fistula in ano when it occurs under circumstances that indicate a speedy fatal termination of some other disease, because the utter hopeless-

ness of the cure of the grave affection with which it is associated leaves no chance of benefiting the patient. But this consideration differs widely from the indisposition to cure the fistula from the impression of its proving hurtful to the subject of a disease less serious in its character.

It is not by any means satisfactorily shown that any pulmonary or other organic disease becomes aggravated by the cure of fistula in ano, and independent of my own results indicating the relief afforded by a timely resort to an operation under such circumstances, I am endorsed by the authority of Erichsen, who, thirty years since, wrote as follows: "I have, however, in several cases found considerable advantage result by operating for fistula in the early stages of phthisis, or in suspected cases of that disease, the patient's health having considerably improved after the healing of the fistula."

The continuance of such a drain is not proven to be any advantage or its discontinuation shown to be productive of evil, and moreover the change is never brought about suddenly, as the suppuration from the incised surfaces diminishes gradually until the granulation completes the cure. Hence we should not be deterred by this supposed metastasis from the suppression of a customary discharge.

Addendum. April 22, 1881.—The incisions made in Case I. for fistulæ on the right of the sacrum having made favourable progress, the fistulous canals on the left hip were laid open to-day by Dr. Melchert with the co-operation of Dr. Lima, in whose infirmary the negro is under treatment.

One of the canals, being eight inches in length and extending from the lower part of the sacro-iliac junction directly across the external iliac muscle, was laid open with a free incision of the knife passed on the director. Two short tracts were opened likewise immediately over the sacrum. Upon exploring downwards from the principal incision, a fistula was discovered in the direction of the sacro-coccygeal articulation, and was laid open with the director and bistoury down to the outer boundary of the upper part of the rectum. As we could not trace the opening into the canal, and the extensive incisions already made must tax the recuperative powers, it was determined as best to await further observation as to the connection of the fistula with the rectum. When the incisions made formerly and these shall have healed, it will most likely appear that the tract communicating with the canal of the rectum still remains open, and the line of connection can be traced with more certainty. Should this orifice exist, as I am convinced it does, in the mucous membrane, the operation with the écraseur will yet be in demand, as the tissues to be divided will not admit the application of the knife. With a view to promote the granulation, lint well soaked in carbolized oil is placed in the channels of the fistulæ that were laid open, and this dressing will be continued from day to day until the approaching cicatrization admits adhesive plaster.

ARTICLE III.

THE OPERATIVE TREATMENT OF PROLAPSE OF THE VAGINA AND UTERUS.

By A. F. HOUSE, M.D., of Cleveland, Ohio.

THE object of this paper is to present in a concise form the operative treatment of prolapse of the vagina and uterus with special reference to three different methods which have in late years come before and have been indorsed by the profession, namely, Simon's,¹ Hegar and Kaltenbach's,² and Bischoff's.³

The great majority of physicians still cling to the old method of treating these conditions with pessaries.

Among the prominent symptoms associated with prolapse of the vagina and uterus, pain in the back and loins, a constant feeling of impending loss of something from the external genital organs, painful and disturbed micturition, a disordered condition of the bowels, and nervousness varying from slight irritation to well-defined hysteria, may be mentioned. In view of the great number of women so afflicted, and the attention these conditions must necessarily have received from observing physicians in all ages of the world, is it not almost astounding to think that the first attempt at operative treatment of which we have record was made in the 19th century? Surgical treatment having been suggested, a brisk contest ensued between different operators as to the relative merits of the treatment they respectively advocated, until finally at this date operative procedure has been brought to such a state of perfection that Hegar and Kaltenbach can with justice say that kolpo-perineorrhaphy, in the surety and completeness of its results, stands equal in importance to any gynecological operation, with perhaps the single exception of vesico-vaginal fistula.

In none of the systematic works on gynecology accessible, has an attempt been made to present the various operations devised with an analysis of the results attending them, while in the majority of cases each author mentions only the single method he may have originated or adopted. As an established usage is not always applicable to an individual case, it happens that the profession often attempts what has been already tried and discarded, for want of that information our leading lights should have placed within its reach. A brief *résumé* of some of the efforts and the progress made in this direction is therefore profitable.

The site of every operation for prolapse of the vagina and uterus has been respectively—1. The vulva. 2. The introitus, or entrance to vagina proper. 3. The vulva and perineum. 4. The vagina. 5. The perineum, vulva, introitus, and vagina proper, strengthening the whole septum-recto-vaginalis (Kolpo-perineorrhaphy).

¹ Prager Vierteljahrsschrift, 1867.² Die Operativ Gynæcologie, Erlangen, 1874.³ Die Kolpopernioplastik nach Bischoff von Dr. Banja. Basel, 1875.

The operation proposed and executed by P. C. Huguier,¹ of which mention will be hereafter more particularly made, rests upon an entirely different principle from the foregoing operations.

Gérardin in 1823 was the first who attempted to cure prolapse by operative means. His method comprised simply cauterization of the vaginal walls. During the year 1830, Mende proposed the operation of hymenorraphy, consisting, as its name implies, of an artificial hymen, but did not carry it out. Not much later Fricke attempted episiorraphy, by freshening the lower third of both labiæ majoræ and the posterior commissure and uniting them with the quilled suture. The result was somewhat unsatisfactory. Malgaigne freshened deep into the introitus, as did also in about the same way Baker Brown, Crédé, Dieffenbach, Kiwisch, Küchler,² Linhardt, and Scanzoni. Heyfelder, Dammes, and Schiffer followed with a poor modification of episiorraphy, by drawing one or more rings through both labiæ. We have next a series of operations, the so-called kolpodesmorrhaphy, performed with a view of narrowing the vagina, and thus retaining the prolapsed parts *in situ*. These operations consisted in excising a number of folds of vaginal mucous membrane and at the same time inducing adhesions to neighbouring parts. Gérardin, aforementioned, was the first to propose this principle.

Benj. Philips cauterized the vaginal walls with fuming nitric acid, and thereby obtained favourable cicatricial contractions; while Dieffenbach, Henning, Kennedy, and Velpeau drew the actual cautery over the vaginal mucous membrane in lines lying in the direction of its long axis, and Colles and Simon caused a ring-formed eschar at or near the cervical insertion. The "pincement du vagin" of Desgranges, although soon abandoned and forgotten, consisted in applying strong serre-fines to longitudinal folds of vaginal mucous membrane, then reapplying them to fresh folds, for months afterwards. He used chloride of zinc in his later operations. What would the modern physician say to Chipendale's proposition to inoculate the vaginal mucous membrane with gonorrhœal virus in the hope of obtaining cicatricial contraction similar to that of stricture of the male urethra? Bellini and Blossius performed kolpodesmorrhaphy by applying ligatures to portions of the vaginal mucous membrane until they sloughed off. More recently the elastic ligature has been frequently employed for the same purpose. Folds of mucous membrane of various lengths are raised with two pairs of toothed forceps, and a number of Karlsbader needles or hare-lip pins are passed through the base of these folds, and beneath the needles or pins a piece of rubber tubing is tightly applied and allowed to remain until the fold sloughs off, which usually occurs between the 8th and 11th days. As other than mucous membrane is often included in these folds, as the parts are slow to heal, as the disagreeable

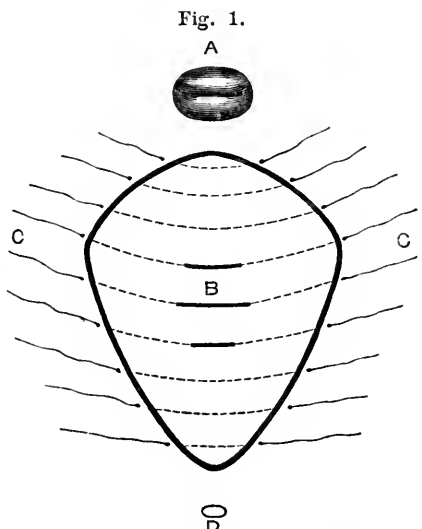
¹ Mémoire sur les Allongements hypertrophique du col de l'Uterus, etc. Paris, 1860.

² Die Doppelnath zur Damm-schamscheidennath, u. s. w. Erlangen, 1863.

fetid discharge is decidedly unpleasant to the patient, and as the operation does not secure a firm and durable cicatrix, its results have been unsatisfactory. This operation can be performed perhaps with favourable results where the prolapse of the anterior vaginal wall is but slight, or where there are folds of hypertrophied mucous membrane.

To Marshall Hall the credit is due of having first performed elytrorrhaphy. He excised an elliptical piece of mucous membrane from the anterior vaginal wall and united the edges of the wound with the quilled suture. A number of other operators removed elliptical or oval pieces from the lateral vaginal walls. More recently Simon connected this method with epesio-elytrorrhaphy. Marion Sims revived and revised this operation with a modification of his own in 1858. Through him we were made acquainted with a good vaginal suture. Where the prolapse is slight, and the patient can shun herself, a favourable result may be obtained. The so-called "median" operation of Spiegelberg¹ is a very peculiar one. By it the middle of the lower portion of the anterior vaginal wall is suspended to the middle of the upper portion of the posterior one. But the operation of kolporrhaphy anterior of Hegar and Kaltenbach answers all expectations, and consists in removing an elliptical portion from the anterior vaginal wall (Fig. 1). The upper angle is made as blunt as possible for the purpose of increasing the breadth of the wound lying nearest the portio vaginalis to the fullest extent consistent with the parts. The simple lithotomy position is the best for the patient. As the operation is scarcely ever accompanied with severe pain, it is quite unnecessary to use anæsthetics. In 33 cases Rokitansky has had no occasion to use chloroform.

In operating, Hegar and Kaltenbach direct that the vaginal membrane be seized with a double tenaculum about one-third to one-half inch from the anterior lip of the cervix, as near the median line as possible; another tenaculum attacks the membrane from one-third to three-quarters of an inch from the orificia urethræ externa within the vagina, and two more tenacula are applied opposite each other at the lateral margin of the vaginal surface about to be



A. Os uteri. B. Flap on anterior vaginal wall excised. C. Sutures. D. Os urethræ externa.

¹ Zur Entstehung und Behandlung des Vorfalles der Scheide und Gebärmutter. Berliner Klinische Wochenschrift, 1872.

freshened. Slight traction being now made upon each tenaculum in opposite directions, a smooth field for operation is exposed corresponding to the size of the mucous membrane it is desired to excise. Its amount depends entirely upon the extent of the prolapse and the excess of tissue in the vaginal wall. In order to determine this amount, a fold of membrane may be picked up by tenaculæ on each side of the median line and approximated, thus making apparent the condition of the vagina after the operation. It is sometimes taught that the prolapsed parts should be placed *in situ* before freshening, but as this merely complicates and renders the operation tedious without corresponding benefit, it is entirely unnecessary. The boundary of the part to be freshened should be marked out with a sharp scalpel, whereupon the mucous membrane, at its lowest angle, should be seized with a pair of toothed forceps, and dissection commenced with a sharp scalpel, applied first to one, then to the other side. To be ambidextrous is of great advantage. The removal of the mucous membrane is generally accomplished with but little trouble, care being taken that all ragged and uneven edges be smoothly trimmed with forceps and scissors. Severe hemorrhage, and a soft friable and relaxed condition of the vaginal membrane with cicatricial eschars may complicate the operation. Hemorrhage is, however, usually easily controlled by the application of an ice-cold sponge, torsion of the bleeding vessels, and finally closure of the wound. Hegar and Kaltenbach unite by insertions deep into the tissues and use silk sutures. These are removed in from ten to fifteen days, and it is well not to be in too great haste. Before operating, the bladder should be entirely emptied by the catheter, the vagina and the whole external genital organs should be thoroughly drenched with a three per cent. solution of carbolic acid, as well as occasionally during the operation, and again when the sutures have been fully adjusted and the parts placed *in situ*. The preliminary and subsequent treatment is similar to that of kolpoperineorrhaphy, of which mention will hereafter be made, with the exception of tying the knees together. The patient should not leave her bed before the fourteenth day, and should abstain from household duties for a still longer time.

Kolporrhaply anterior is not a serious operation. It requires but a moderate amount of operative skill, is not followed by evil results, but can be most favourably commended for its effects upon cystocele; it aids very materially in reducing prolapse of the uterus with complete prolapse of the vagina; it sometimes insures the good results of kolpoperineorrhaphy, and therefore should, in my opinion, precede all operations whose helpmate it is.

Elytrorrhaphy posterior, *per se*, excludes freshening of the introitus and vulva, is applicable to those cases where there are great relaxation and folding of the posterior vaginal wall, and can properly only be regarded as an adjunct of kolpoperineorrhaphy. Whether the mucous membrane to

be excised lies in the upper or lower part of the posterior vaginal wall, it has still mostly an elliptical form, and is united by suture. The field and method of operation are so similar and so closely allied to operations to be discussed hereafter that it is unnecessary to give details now.

Before considering the respective operations of Simon, Hegar and Kaltenbach, and Bischoff, for the cure of prolapse of the vagina and uterus, attention is drawn to Huguier's treatment of these conditions. This French gynæcologist says in his work, page 49, that the disease described by authors under the name of Prolapsus is, in the large majority of cases, nothing more nor less than an elongated hypertrophy of the supra-vaginal portion of the cervix uteri, and he considers this elongation not as a consequence, but as an actual cause of the prolapse. Consequently, he proposes to cure prolapse by the amputation of the supra-vaginal portion of the cervix. Spiegelberg, in objecting to this idea of causation, maintains that the elongation is secondary in a majority of cases, being induced by the dragging of the vagina and bladder upon the uterus whose tissues, as well as those of its immediate appendages, are in a relaxed, ductile, and weakened condition. Position and constant downward traction he assumes to be causes, not effects. According to personal observations, I must believe this hypertrophied elongation of the supra-vaginal cervix to be secondary. Several times cases have come under my care exhibiting but slight prolapse of the vaginal walls and the normal position of the uterus, yet whose cavities at first measurement indicated a length of from two and one-half to three inches. In the course of time the prolapse of the vaginal walls progressed more and more until it became complete, while simultaneously the os uteri externum continued to descend lower and lower until finally it protruded far beyond the external genitals, while the fundus of the uterus retained its normal height, thus increasing the measurement of its cavity variously from five to seven inches.

Nevertheless, there may be cases of prolapse wherein an hypertrophied elongation of the portio supra-vaginalis is primary, but they cannot be distinguished from those in which the hypertrophy is secondary. Where hypertrophy is the primary cause, a cure may under favourable circumstances be reached by Huguier's method; but, in the majority of cases of prolapse of vagina and uterus with hypertrophied elongation of the supra-vaginal cervix, a cure can never be induced by Huguier's operation.

In a large number of cases of prolapse we find an hypertrophied state of the infra-vaginal portion of the cervix, named by Spiegelberg, circular hypertrophy. Observation has taught me that in prolapse of the uterus and vagina with hypertrophy of the supra-vaginal portion of the cervix, either with or without conjoined hypertrophy of the infra-vaginal portion, amputation after Huguier's method, or simply amputation of the infra-vaginal portion as practised by many of his followers, is entirely useless and without favourable result. Ample opportunity was afforded

me by Rokitansky at the Maria Theresa Woman's Hospital at Vienna of watching the course and results of a simple replacement of the prolapsed parts without amputation, care being taken to retain the same *in situ*, and to enjoin absolute rest on the patient. By this means uterine cavities measuring five and seven inches were reduced to two and three-fourths, and three and one-half inches respectively, thus clearly proving the rapid diminution of the hypertrophied parts by mere replacement and rest. Rokitansky possesses a very instructive preparation by way of demonstration of this fact. Upon receiving a patient into the hospital on the 13th July, it was found that her uterine cavity measured seven inches. On the next day he performed kolporrathy anterior; on the 27th July, the patient died of cerebral apoplexy. At the post-mortem the uterine cavity measured but four inches, thus showing a reduction of three inches in thirteen days.

In my practice I pay no attention to simple hypertrophy of the cervix uteri, but perform the operation of kolporrathy anterior. The time the patient is obliged to remain abed is usually sufficient to reduce the elongated and hypertrophied uterus to quite its normal size. From its rapid decline in size under such circumstances it is fair to assume that its enlarged condition is partially due to œdema. It should be understood, however, that amputation of the prolapsed cervix is the only cure in cases of hypertrophied elongation of the infra-vaginal portion of the cervix without vaginal prolapse.

The operations to which special attention is hereby drawn, those of kolporrathy posterior of Simon, kolpoperineorrhaphy or perineauxesis of Hegar and Kaltenbach, and perineoplasty of Bischoff, seek to permanently narrow the vagina, change its axis forward and upward, and strengthen the recto-vaginal septum. Some description of the details of these operations is necessary in order to clearly apprehend their differences and relative merits.

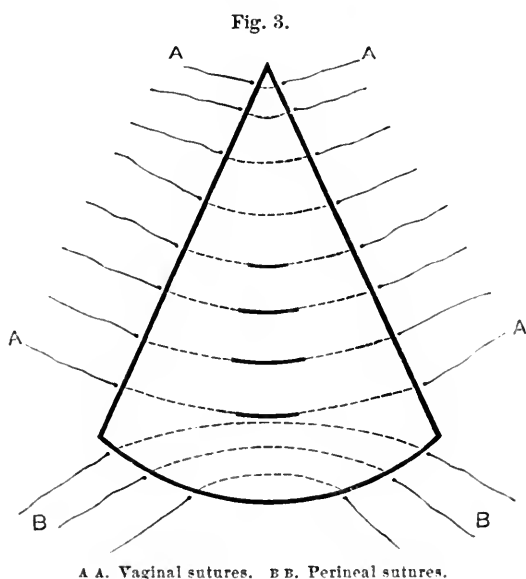
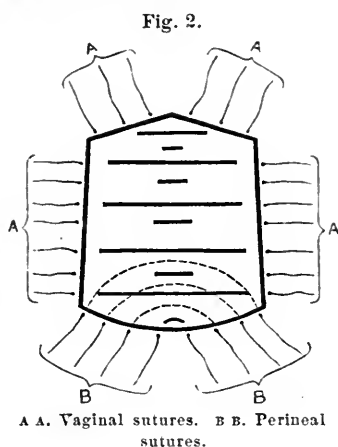
In Simon's operation of kolporrathy posterior, the patient is placed upon her back with her thighs flexed upon her abdomen. Simon's speculum, a modification of Sims', is then introduced for the purpose of raising the anterior wall of the vagina; two of Simon's flat specula are applied to the labia and the lateral walls of the vagina. Thus the field of operation is fairly presented to view. Along the boundary of the true skin and the mucous membrane of the vulva an incision is made varying from two to two and one-half inches in length (Fig. 2). Upon the line of this incision as a base, a pentagonal figure is constructed, whose sides vary from two to two and one-half inches, and whose apex lies in the medium line of the posterior wall of the vagina. This can be more perfectly represented by a diagram.

The mucous membrane covered by this figure is then excised, and the wounded surface coaptated by using alternately the deep and superficial silk sutures. In order to properly conduct this operation the operator should

have five assistants, three of whom should be acquainted with the operation. The armamentarium consists of, 1, Sims' or Simon's specula of different sizes; 2, two of Simon's lateral specula; 3, a number of scalpels; 4, a curved scissors; 5, two pairs of toothed forceps; 6, Jobert's or Bozeman's needle-holder and catcher; 7, a number of single and double-hooked tenacula; 8, Chinese raw silk for sutures; 9, an Esmarch's irrigator; 10, sponges; and 11, a number of long and short needles. Under favourable circumstances the duration of the operation varies from one to three

hours. In the after-treatment a soluble condition of the bowels should be maintained, and the catheter be resorted to when the patient fails to pass water spontaneously. The perineal sutures should be removed on the fourth, and the vaginal sutures about the ninth to the eleventh day.

When performing kolpoperineorrhaphy or perineauxesis, Hegar and Kaltenbach place their patient in a lithotomy position. They excise a triangular piece of membrane from the posterior vaginal wall (Fig. 3). Its apex forms

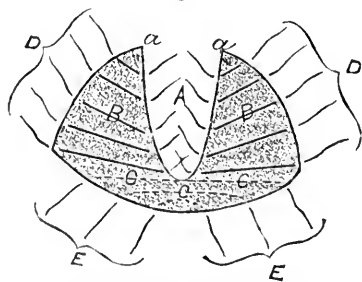


an acute angle at a point from one-half to one inch from the portio vaginalis. The portion excised extends to and runs in a curve along the posterior

commissure. The instruments required are practically the same as those used by Simon, and the time of operation about the same. The wound is united by the silver wire suture, and the vagina is thoroughly douched through the irrigator with a solution of chlorine water. The patient is permitted to assume any recumbent position. Fetid discharges are combated with vaginal injections, and the smarting or burning of the wound is allayed with liq. plumbi subacet. in solution or cold compresses. The bowels should be kept open and the perineal sutures should be removed in three to five days. After that time a generous, nourishing diet should be allowed if there be no fever. The vaginal sutures are not removed until the fourteenth to the twenty-first day, and not even then if tension and swelling exist.

Preparatory treatment of the patient is necessary before attempting the operation of kolpoperineoplasty of Bisehoff. The uterus should be replaced; leucorrhœa, erosions of the cervix, and all inflammatory symptoms should receive careful attention. The bowels should be properly evacuated by enemata, and the operation performed a few days after the cessation of the menses. The patient likewise, in this operation, takes position as in ordinary lithotomy. Four assistants are sufficient. A pair of scissors curved on the flat, a vulsella, several flat specula, with the instruments, etc., mentioned in connection with Simon's operation, complete the outfit. The anterior vaginal wall is elevated by a flat speculum, while two assistants separate the labia on each side respectively by pressure with three fingers, thus fully exposing the posterior wall of the vagina. A tongue-shaped flap is then marked out with a scalpel (Fig. 4). Its apex lies at the margin of the posterior commissure, and its base is from one and one-half to two and one-half inches above on the posterior vaginal wall; it lies over the median line, and has a width of from three-fourths to one and one-half inches. This tongue-shaped piece of mucous membrane is dissected from the vaginal walls, but remains attached at its base. On

Fig. 4.



A tongue-shaped flap. *a a*. Base of same.
B B. Triangular pieces. *c c c*. U-formed
 perineal pieces. *D D*. Vaginal sutures. *E E*.
 Perineal sutures.

each side of the tongue-shaped flap a triangular piece of mucous membrane is excised. The apex of each of these triangles is at the side of the base of the tongue-shaped piece. From this point a line is drawn to the middle of the labia majora on each side, and the mucous membrane between this line and the tongue-shaped piece is completely excised. The mucous membrane lying external to the introitus between the perineum and the points on the

labia majora to which the mucous membrane of the vagina has been denuded is U-shaped, though with horns widely diverging, and this also is denuded to the edge of the true skin. Hemorrhage is usually easily controlled by torsion and ice. Care should be taken to remove all islets of mucous membrane and to leave a smooth denuded surface. The success of union by first intention depends largely upon this. The flap is secured to its new attachment by interrupted sutures, beginning at the base of the flap and so applied as to bring the apex of the flap in contact with the lateral margin of the denuded part bordering the flap. Slight traction with forceps or vulsella upon the edges of the wound will facilitate its coaptation. After the flap has been adjusted the perineal wound is closed. It is apparent that as the flap is made larger or smaller, and the denudation of the vaginal outlet is increased or decreased, we can break the axis of the vagina at a point more or less distant from the introitus, and simultaneously reconstruct the vagina and perineum. The operator should recollect that the efficiency of the operation depends not merely upon narrowing the vagina, but upon changing the direction of its axis. Hence the necessity of a long and thick perineum.

The after-treatment is simple. A tampon dipped in carbolized oil or water is inserted into the vagina, and the perineal wound covered with a cloth saturated with the same solution. A cotton tampon is laid over this and fastened with a T bandage, for the purpose of exerting slight pressure and preventing the filling of the wound with blood. After twenty-four hours this bandage as well as the tampon should be removed, and the patient kept in the dorsal decubitus with knees slightly bent. It matters little if the bowels are moved daily, although perhaps it is better that they should be constipated for the first four or five days. Subsequently mild salines, to induce daily stools, are useful. The diet should be mild and unstimulating. Due attention should be given to this, as to all fresh wounds, and proper rest be given to the wounded parts. If the operator carefully observes antiseptic treatment, union by first intention will be the rule. The perineal sutures are removed after about fourteen days, and the vaginal sutures some days after this. The patient should keep her bed for at least fourteen days after the operation.

In applying in a general way the principles laid down by these authors to cases falling under my direction, my armamentarium consists of: 1, a double tenaculum; 2, a number of scalpels; 3, a pair of scissors curved on the flat; 4, one or two pairs of toothed forceps; 5, a pair of forceps smooth at the point, used in holding knots while tying sutures; 6, a number of artery forceps; 7, Langenbeck's needle-holder; 8, Bozeman's needle-holder and catcher; 9, Sims', Emmet's, and surgeons' needles; 10, surgeons' silk, No. 2 for vaginal, and No. 3 for perineal sutures; 11, carbolized catgut for ligating bleeding vessels; 12, sponges; 13, a 6 oz. hard-rubber syringe; 14, a flat speculum for elevating the anterior wall of the

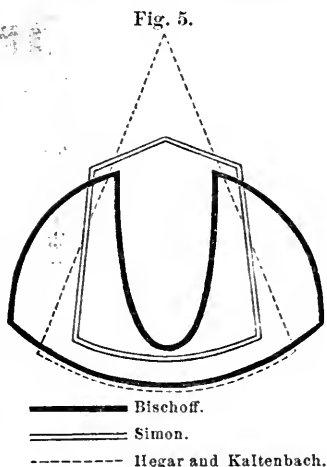
vagina; 15, two wooden specula for the labia and lateral walls of the vagina; and 16, one or two tenacula, and ice-water for sponges. Two good assistants, or at least two intelligent women, are indispensable as aids, while three or four add very materially to the ease of the operator. The instruments are arranged in order upon a stand, within easy reach while operating.

When time and convenience permit, my patient is directed to use warm sitz-baths for some days previous to the operation, to keep her bed, and to live upon light, easily digestible food. If the vaginal walls are firm, a 2 per cent. solution of carbolic acid in glycerine, soaked into a cotton tampon and changed every twelve hours for a few days, is inserted into the vagina. The day before operating, a mild saline laxative is given, and a few hours before an enema, in order to clear the rectum of any remaining fecal matter. The patient is placed in the lithotomy position, with the nates well over the edge of the operating table, so that the vulva is easily accessible. As denudation of the introitus and perineum is painful, full anæsthesia is necessary by any method. Before operating, the perineum and vulva should be shaved at least to the height of the middle of the labia majora, the bladder catheterized and emptied completely of its urine, and the external genitals should be well cleansed with a 3 per cent. solution of carbolyzed water. The patient should lie upon her back, care being taken that the pelvis inclines neither to the one nor the other side, lest an asymmetrical wound result. To secure perfect coaptation the labia majora should be brought together, and at the point where denudation shall commence a slight incision be made. This will mark clearly the prolongation of the vaginal freshening, and will insure a perfect perineum. The vaginal wall is better presented by having an assistant pass one or even two fingers into the rectum, and, by pressure on the anterior rectal, causing the posterior vaginal wall to bulge forward. Placing it thus gently upon the stretch, the field becomes smooth, and excision of the mucous membrane much less tedious. In one of my cases it became necessary to remove a flap measuring four and a half inches in length, with a base of three and one-half inches. To change sufficiently the axis of the vagina, and to render the necessary support to insure against subsequent malposition of the uterus, a broad and thick perineum became essential, so that the labia majora was denuded and united by suture to one-half its height. The restored perineum measured two and a quarter inches.

Of the three operations herein specially discussed, that of Hegar and Kaltenbach is probably easiest; then follows Simon's; while Bischoff's is the most difficult, and requires the most patience, skill, and attention to details, indeed some ingenuity in dissecting off the tongue-shaped flap, which should not only consist of mucous membrane, but also of submucous tissue. While dissecting, it is well to douche the parts frequently with a 3 per cent. solution of carbolyzed water, as again before introducing this

suture, when the whole wound should be thoroughly cleansed. I have always used silk for the vaginal sutures. After closing the wound, superficial sutures are introduced when the margins of the wound do not meet perfectly, and the parts are again douched with carbolized water. Both silk and silver wire have been used for the perineum with equally good results in my experience. After the kolpoperineoplasty of Bischoff, a tampon, saturated with a 2 per cent. solution of carbolized water is introduced into the vagina. As I have tied the knees together for five or six days, and the patient has been required to keep the dorsal decubitus as well, it has seemed unnecessary to apply the T bandage to hold the tampon to the perineal wound. The catheter is rarely necessary, and should only be used when the patient cannot micturate spontaneously. If there has been no stool for the first four days, it is induced by enema. Vaginal injections of a 2 per cent. solution of carbolized water are daily used. The diet for the first five or six days consists of light soups, gradually yielding to the usual nourishment of a healthy subject. The perineal sutures are removed on the fourth or fifth day, but the vaginal not before the fourteenth to the twenty-first day. The patient should not leave her bed for at least twenty-one days, and should abstain from hard labour for several weeks more. There is usually little or no febrile reaction, and the smarting and burning of the wound can be allayed by cold applications. The operation should be performed after menstruation, and not sooner than eight or ten weeks after confinement.

Which of these methods, it may be asked, causes the greatest lesion? Which the least? Which affords the best chance of union by first intention? Which from every point of view is attended with the most favourable results? It may be briefly answered that the guarantee of a good result is determined by a strong recto-vaginal septum, based upon a perineum which has been lengthened and thickened, and thus changes the axis of the vagina in its lower half forward. Narrowing the vagina, *per se*, has no lasting result, though it diminishes its calibre to the smallest size consistent with the parts operated upon. In Bischoff's operation the greatest change is effected in the vaginal axis, and the vagina is decidedly narrowed, as shown in the accompanying diagram (Fig. 5); therefore we may reasonably expect from it the most happy results. It is, however, a somewhat complicated operation, and should only be attempted by one who is specially skilled in plastic operations, and particularly those of the female genital organs.



Where large cicatricial contractions of the perineum and vagina exist, it may be impossible to form a tongue-shaped flap, while in extreme relaxation of the posterior wall it becomes necessary to substitute this operation by one of the two others. Simon, whose operation is much simpler, has cured the majority of his cases. Hegar and Kaltenbach have met with excellent results; and this operation narrows the vagina, changes its axis, and creates a strong and thick recto-vaginal septum.

ARTICLE IV.

ARE ALL ANÆSTHETICS DANGEROUS WHICH CONTAIN CHLORINE, BROMINE, OR IODINE ?¹ By EDWARD T. REICHERT, M.D., of Newark, N. J., formerly Demonstrator of Experimental Therapeutics and Instructor in Experimental Physiology in the Post-Graduate Course of Medicine in the University of Pennsylvania.

As early as 1849, Nunnelly (*Trans. Prov. Med. and Surg. Association*, xvi. 1849) stated that the effects produced by *chloroform* by a like quantity and in parallel circumstances, as far as could be ascertained, were similar but not identical, and that they were far more considerable in some cases than in others, and even upon the same animal the effects of the same dose were greater at one time than at another. Proof of this truth is not wanting, but is unfortunately only too plentiful, as is instanced in the frequent deaths which have been reported as occurring from the use of this agent, and by doses wholly out of proportion to the effects produced. To the experimental physiologist and therapist, similar cases occurring in animals during anæsthetization with chloroform must be numerous, if this agent has to any extent been employed; and, in speaking from personal experience in the chloroformization of some hundreds of animals, many such instances are recalled to mind,—some indeed, which are even the more striking because of sudden death occurring after the removal of the inhaler, and before complete anæsthesia was induced (see also Report Brit. Med. Assoc. Committee, *Brit. Med. Journ.*, 1879); and even deaths taking place in patients under similar circumstances are not want-

¹ It was the author's intention to give, in connection with the following notes, the results of a physiological research which has been commenced in this connection, but upon a second consideration it appeared doubtful as to how soon this investigation would be completed. As anything of practical value relating to anæsthetics must always be of momentary importance to the profession, and as there is much to be learned from the literature of the subject alone, and as there are many facts herein contained which are of considerable interest and not generally known, and may prove of immediate value to both the therapist and experimenter, it was deemed best not to withhold this portion of the paper, but rather to let the record of the experiments follow, as a separate article.

ing, as is attested by Kappeler (*Part XX., German Surgery*, by Billroth and Luecke, quoted by Reeve), and by records of chloroform deaths already reported. In Kappeler's case death occurred in two minutes after the administration of chloroform had been stopped. In the report of the British Association's Committee on their experiments on animals it is stated that in two instances sudden and unlooked-for effects on the heart occurred after more than a minute had elapsed since the administration of any chloroform. My own experiments on animals with the *ethyl bromide* have yielded similar results, and so strikingly analogous that I can safely assert, that, were the results of my experience with the deaths following the use of chloroform and the ethyl bromide in anæsthetization tabulated in parallel columns, not even the keenest observer would be able to tell which was which. In the laboratory the bottles containing these compounds were on the table together, and were employed without any special choice, the nearest or handiest being used; and I must acknowledge that, where death ensued, as it did in quite a number of instances, the only way I knew which one of the two was the cause of it was by resorting to the odours of the two, and thus distinguishing them—their toxicological effects being so similar as to be beyond the power of discrimination. The same remarks apply equally well and with equal positiveness to several other chlorinated and brominated anæsthetics, and the list could be considerably amplified were it necessary, or did space permit.

That the halogens are decided and general depressants of the animal organism is a fact undisputed by the therapist; that they exert a special depressant influence on the heart is universally conceded; and that most of the compounds in which either of these elements enters, especially in an elementary form and in any well-marked or appreciable proportions, partake to a greater or less extent of this depressant quality, and more especially so, if the elements are in a loosely molecular condition, such as is probably the condition in all ethers, is also acknowledged. Consequently, in looking over the list of compounds used as anæsthetics (some thirty or forty in number), it was a noticeable fact that the compounds containing either of these elements were, as a rule, unmistakably more dangerous than others; and the obvious reason of this was the presence of one or the other of these principles, which, being in a probably loosely molecular combination, acted either in combination as such, or were readily dissociated under favourable conditions, and at such times made their decidedly parietic action on the heart manifest. The writer would not here be understood as inferring that either in these toxic elements, or in their probable liberation in the system alone, resides the power of causing sudden, abnormal, and overwhelming effects, or of being invariably the cause of sudden death; for it must be apparent that peculiar idiosyncrasies, general asthenic conditions and especially so of the heart, the greater impressionability of the heart or of its nervous mechanism at times than at others

(even in apparently normal states of the economy), variations in the temperature of the surrounding media causing a greater volatility of the compound used, and the necessarily greater concentration of the vapour inhaled, etc. etc., must play at times a very important part in such cases. However, that all chlorinated, brominated, and iodated anæsthetics may act at times altogether out of proportion to the dose and under similar circumstances, and that those which have already been used to any extent have done so, is well attested in the papers already written, or by experiments recently made by myself on animals, as well as by the numerous deaths which have been reported from the needless use of this group of substances.

To look over the death-list from anæsthetization by this particular class of compounds, and in cases in which they were not especially indicated, and where some of the safer anæsthetics, such as ether, would have answered the purposes required, and where they have been unjustifiably used before their physiological actions were previously determined by experimentation on animals, and their safety assured or their dangers indicated, is positively appalling; while the number of cases, almost innumerable, where life's fragile thread was almost broken, the trusting patient but snatched from the chasm of death by the timely administration of physiological antidotes or the almost superhuman efforts of the physician and attendants, is alike shocking. Let us but glance at the chloroform death-list, and, as horrible and incredible as it may seem, there have been *reported* an average of about *a death for every month since the time of its introduction*. With this array of fully authenticated cases before us, what, indeed, must be the actual number?—for it must be conceded that probably double, triple, or quadruple as many more were not reported, and will never come to light. Even Kappeler alone says that he knows of four cases never reported, and personally I know of two. However, it needs no words of mine to remind the profession of the dangers of chloroform; so let us but briefly notice several others of this class of anæsthetics.

Methylene Bichloride, which was introduced by Richardson (*Med. Times and Gaz.*, 1867, p. 478) as a pleasant anæsthetic, but in connection with which he expressed no definite opinion as to its safety, has now been entirely cast aside by the profession as being entirely too unsafe. Kappeler says that experience shows it to be as dangerous, if not more so, as chloroform, and furnishes a list of nine cases of death from its use. Unfortunately, I have not had a copy of Kappeler's work at my disposal; but in looking over the details of cases published in the journals to which I have had access (*Med. Times and Gaz.*, 1869, ii. p. 524; *Lancet*, 1869, p. 582; *British Medical Journal*, Sept. 1871; *Pharmaceutical Journal*, 1871, p. 875, two cases; *British Medical Journal*, August, 1872; *Lancet*, 1873, i. p. 23; *Ibid.*, 1877, ii. p. 26), I have found that in several of them doses of a drachm and a half caused death, and, judging from the symptoms, it must be undoubted that death ensued in some of them at least

from cardiac paralysis. The experiments made by the British Committee on frogs show that the heart becomes slowed and is soon stopped, and that *the heart was affected the same as by chloroform*, the first sign of paralysis being the distension of the right ventricle. Even were it not certified by the above Committee that it affects the heart like chloroform, the fact of death occurring after doses but ordinarily sufficient to produce anæsthesia is sufficient to impress every one with the truth that it acts, like chloroform and ethyl bromide, wholly out of proportion to the dose.

Let me revert to *ethyl bromide* or *hydrobromic ether*, which has but recently come into vogue through the recommendation of Turnbull and of Levis, and which has, during the few months of its usage, and indeed very limited usage, added proof to the above-asserted toxic properties of all the brominated anæsthetics. In referring to the articles published by these gentlemen, one is at once impressed with the strong recommendations given the ether, and the enthusiasm experienced in the discovery of so valuable a compound; and Levis (reprint from *Medical Record*) stated, that practically it was the best anæsthetic now in use. But, if what he previously asserted, that "the physiological action of the bromide of ethyl did not incline to the dangers of cerebral anæmia and cardiac syncope, which sometimes occur in chloroform, and that no tendencies in such a direction seemed to threaten," were proven true by subsequent investigation, the ether would not so early have fallen into disuse. And had experimental investigations been pursued in the lower animals previous to those on man, like those by Wood (*Phila. Med. Times*, 1880, p. 370), such unfortunate results would probably not have followed in Levis's, as well as in the hands of others who have followed in his footsteps. While advising his practitioners to be cautious in its use, Levis describes the method of administration preferred by himself, which, in our opinion, is of itself dangerous. His method is this, that "in commencing the inhalation of bromide of ethyl to make a rapid and decided impression, with the lint and napkin held closely over the nose and mouth of the patient." If we have here an agent proven to be dangerous, if not quite as dangerous as chloroform, it needs no further argument to show that the same precautions must necessarily be observed in its administration as with its more popular predecessor.

Squibb (*Medical Record*, 1880, p. 379) warns those who use bromide of ethyl to be cautious, because he deems it of the nature of a loosely molecular compound, and hence he argues its liability to become broken up in the system and bromine liberated. Although the experiments of Wolff (*American Journal of Pharmacy*, 1880) would seem to show that this change does not occur out of the body, yet as we do not know in what form the ether is eliminated, and that fatal effects have followed its use, which resembled those in bromine-poisoning, we are bound to accept Squibb's assertion with deference, at least until it is proven to be otherwise than correct.

But whether bromine is liberated or not does not affect the argument, for we do know that Wolff (*loc. cit.*) found that death occurred in one of his experiments on rabbits, and that it typically resembled that caused by chloroform by sudden cardiac failure; and Wood (*loc. cit.*) has proved that it is a direct cardiac depressant, which I have fully corroborated by my own experiments, and have further indisputably proven that it at times acts altogether out of proportion to the dose used, as already stated; and that at least two deaths have followed its use (Sims, *Medical Record*, 1880, p. 361; Levis, *Medical News and Abstract*, June, 1880). Moreover, several cases have occurred in Philadelphia hospitals in which such alarming symptoms occurred that only by the most strenuous efforts could the patients be rescued from impending death; and a case of this nature is reported by Little (*Medical Record*, April 3, 1880); and other instances, where the administration was stopped, or the ether was refused to be given by resident physicians through absolute fear of disaster, could also be given.

It will, however, undoubtedly be said, and indeed has been said, that neither of the cases reported by Sims or Levis was due to the use of anæsthetics *per se*: in the former instance because of the very depressed condition of the patient; and in the latter because death did not occur until many hours following the administration of the anæsthetic. But in connection with these cases we know, first, that Emmet (*Gynæcology*, 2d edition, p. 746) called the attention of the profession to the danger of administering anæsthetics where any disease of the kidneys exists because of the active part taken by these organs in the elimination of them; second, that Squibb asserts that bromide of ethyl is a loosely molecular article, prone to undergo decomposition in the system and to liberate free bromine; 3d, that ethyl bromide is a marked cardiac depressant, as proven by both Wood and myself, by actual examination. Sims's case certainly did have symptoms in harmony with those caused by some toxic agent such as bromine. The woman also had a marked scantiness in the secretion of the urine, and on post-mortem examination it was found that she had acute catarrhal nephritis, indicating that the kidneys were disabled from performing their function in eliminating the ether, hence its retention and its probable decomposition in the economy, with the subsequent toxic symptoms. In Levis's case it seems plain that a simple explanation of the death of the patient lies in the fact that the heart, which had become so enfeebled from exhausting chronic disease, was unable to bear the strain of the powerful depression of its already diminished powers that ensued upon the administration of the anæsthetic, and as a consequence broke down under the excessive load.¹ And lastly, as evidence going

¹ An analogous instance of a medicine apparently acting out of proportion to the dose is illustrated in the incipient stage of typhoid fever, where, on account of an irritative condition of the bowels, an ordinary cathartic dose will produce hypercatarsis.

towards proving that Sims's case was due to bromine-poisoning, and in corroboration of Squibb's assertion, I quote from experiments made by Nunnelly (*loc. cit.*, 327) with a similar compound, the *Ethylene Bibromide*, as well as with the *Ethyl Iodide* (*loc. cit.*, p. 324), in which similar results followed, in so far that the animals appeared perfectly well after the experiments, but all of them, after some hours, perished from *blood-poisoning* (see, also, *Ethyl Iodide*, *Methyl Iodide*, *Iodoform*).

Methyl Iodide, which was introduced some years ago, has never come into general use because of its being considered unsafe by both Richardson and Simpson. The former observer (*Med. Times and Gazette*, ii. 1870, p. 470) found it to cause great excitement of the heart and circulation, which was evidently a sign of cardiac depression, if what he thought was true, that the *iodine* was the efficient cause of the phenomena which lie outside of the narcotism. He further certifies that the *Amyl Iodide* and *Chloride* act similarly to the *Methyl* compound.

Chloral Hydrate, although not an anæsthetic in a therapeutic sense, has, like chloroform and ethyl bromide, given us painful instances of its acting at times altogether out of proportion to the dose. Fuller (*Lancet*, March, 1871) quotes a case where thirty grains caused death in a young lady. Schwaighofer (*Irish Hospital Gaz.*, 1873) reports another of a drunkard, in which a drachm produced death; and three other cases (Reynolds, *Practitioner*, March, 1870; Watam, *Med. and Surgical Reporter*, Jan. 1871; Fuller, *loc. cit.*), in which forty-five, eighty, and thirty grains respectively caused alarming symptoms, and from the large dose death nearly ensued. Death has resulted from a dose of ten grains (*American Dispensatory*, 1880, p. 396). Other deaths have been reported (*Medical Times and Gaz.*, 1871, pp. 131, 672; Norris, *Lancet*, 1871, i. p. 226, and Browne, *ibid.* p. 574), and in some of these cases indisputable evidences of its power of weakening the heart were present. Did chloral hydrate become decomposed in the system into formic acid and chloroform (Personne, *Journ. de Pharm. et Chimie*, 1870; and Pellogio, *Schmidt's Jahrbücher*, bd. cli. p. 89; Liebreich *Wiener Med. Wochensch.*, Aug. 1860), we could readily account for its acting at times in a manner wholly disproportionate to the dose, and for its being a cardiac depressant; but as recent investigations disprove this theory (Hammertin, *Schmidt's Jahrbücher*, bd. cli.; Rajursky, *Ibid.*, bd. cli.; Amory, *N. Y. Med. Journ.*, 1870; Djurburg, *Schmidt's Jahr.*, bd. cli.; Leurison, *Archiv Anat. u. Phys.*, 1870), we must look elsewhere for this toxic principle.

Hydriodic Ether or *Ethyl Iodide*, also used by Nunnelly (*loc. cit.*, p. 324), was found to be so dangerous as to entirely preclude its use in medicine for anæsthetic purposes; and he states that whatever anæsthetic property it might possess (and this is not insignificant) it never could be employed in practice, as its action is so very deleterious; for out of the four animals experimented upon, three of which were rendered insensible,

all died, and the fourth had not sufficient of the vapour to render it in the least insensible, and yet for two or three days it was doubtful whether it would recover. Like the bromide of olefiant gas (ethylene bromide), its immediate effects were not so dangerous as the consequences of inhalation were in a few hours; even when not enough to produce insensibility had been used, and when the animal to all appearances had been perfectly well, death would supervene. In one case the odour of the ether was distinctly perceptible in the brain twelve hours after death, and Nunnelly thinks that death was caused by *blood-poisoning*. Therapeutically it has been used in recent years "*by inhalation to bring the system speedily under the influence of iodine.*" (*National Dispensatory*, 1880, p. 114.)

Bromide of Olefiant Gas or *Ethylene Bromide* was also condemned by Nunnelly (*loc. cit.*, p. 327), who stated that, although it produced insensibility, it caused the respiration to become laborious, and although the appearances of distress speedily disappeared when the animals were released, yet in a few hours they all, without exception, died. He further remarks that in this respect it differs from other (?) anæsthetics, because of the animals appearing well immediately following the experiments, but soon dying. He attributes this effect to *blood-poisoning*.

Iodoform was not sufficiently volatile to cause anæsthesia (Nunnelly), but, from what we know of its use, when given per stomach or used locally, it possesses powerful anæsthetic (analgesic) properties. Unfortunately it has not been used sufficiently internally, nor have physiological experiments been pursued to such an extent as to give us an accurate knowledge of its action on the economy; yet we do know that it diminishes the pulse-rate, produces muscular and nervous debility, and is decomposed in the body, and that, when applied to mucous, serous, or abraded surfaces, it *becomes decomposed by the fat, and the iodine is eliminated from the body in the form of soluble iodides*. If iodine is liberated in the system, no further comment is needed.

Carbon Dichloride or *Chloric Ether* has been used to a sufficient extent to indicate that it produces distinct cardiac depression.

Bromoform, which possesses undoubted anæsthetic properties, was found in experiments of my own to powerfully depress the heart, and in one experiment on a small dog the intravenous injection of thirty minims of the preparation caused immediate cardiac arrest. Consequently, it was considered useless to pursue any further investigation in this line.

Tetrachloride of Carbon (CCl_4) was used by Laffont (*American Dispensatory*, 1880, p. 354), who found that it caused great debility of the heart, and lowering of the vascular tension. Simpson (*Medical Gazette*, 1865, ii. p. 651) previously used it under the name of *Bichloride of Carbon*, or *Chlorocarbon*, and more recently the same compound has been used by Smith (*Lancet*, 1867, i. pp. 575, 660). The latter observer found, in the post-mortem examinations of the animals experimented on, that

the auricles were much distended with blood, and especially on the right side. He noticed that the heart did not beat after the cessation of respiration, and that the pulse was decidedly lowered. In conclusion, it is stated that "when pushed to extremes it seems to destroy life by causing an arrest of the circulation of the blood through the lungs, a distended condition of the right side of the heart, an insufficient supply of blood to the left side of the heart, and consequently diminished systemic circulation."

Chloride of Ethylene, or *Ethylidene* or *Ethidene*, was first used by Snow (*Anæsthetics*), and more recently by Liebreich (*Med. Times and Gazette*, 1870, i. p. 642); the British Medical Association Committee (*Action of Anæsthetics, British Medical Journal*, 1879); Bird (*Medical Times and Gazette*, 1879, i. pp. 62); and Reeve (*New Remedies*, Nov. 1880, p. 334—quoted from *Chicago Med. and Surg. Examiner*, June, 1880). Liebreich considers it somewhat safer than chloroform; the British Committee found an enormous diminution in the arterial pressure, and that the heart-beats became so infrequent as to be virtually ineffectual in supplying the respiratory centres with blood. Bird esteems it a powerful cardiac stimulant, and states that all the patients under its influence presented the appearance of a strong cardiac stimulant, but that he would not like to keep a patient long under its influence for fear of a reaction in the opposite direction. His investigations were not carried far enough to justify this conclusion of its cardiac action, and, as his conjecture is contrary to the results of all other investigators, it must be rejected as untenable. Reeve found a diminution of blood pressure, which differed from that caused by chloroform, because it did not advance to complete extinction, nor exhibit such wide variations in its effects at different times in the same animal. A death from its use in Berlin has been reported by Kappeler (*loc. cit.*). Steffer (Binz's *Evidences of Therapeutics*, p. 69) says that it resembles chloroform in ultimate action, yet is not so dangerous.

Ethylene or *Ethene Bichloride*, or *Dutch Liquid*, was used by Nunnelly (*loc. cit.*), who speaks of it in a decidedly laudable way, stating that just as small a quantity will produce anæsthesia as chloroform, but that a much larger quantity is required to destroy life. Simpson (*Edinburgh Medical Journal*, 1848, vol. viii. p. 740) also made some investigations with it, and found that when its vapour was inhaled, it caused so much irritation in the throat that but few persons could endure inhaling it until anæsthesia was produced, and that the condition of anæsthesia was not attended with any excitement of the pulse. On himself it produced such a degree of irritation in the throat that it did not disappear for many hours. Recently, the British Committee (*loc. cit.*) used it, and report that no anæsthesia was produced up to the commencement of convulsions. The results of a series of experiments (*Phila. Med. Times*, May 7, 1881)

made by the writer with this compound indicate that it is a powerful anæsthetic, and that it fulfils considerable that Nunnelly claimed for it. It is undoubtedly a direct cardiac depressant. Why the British Committee got such anomalous results is rather curious.

Butyl Chloride (British Committee) caused the cardiac pulsation to become weaker, and finally extinguished; while *Methyl Chloride* only effected drowsiness. *Isobutyl Chloride* was not noticed as regarding any cardiac action.

Notwithstanding the fact that the above array affords indubitable proof to warrant the assertion that probably all chlorinated, brominated, or iodated anæsthetics do act as cardiac depressants, and goes to sustain Squibb's belief of their molecular condition, and as it likewise shows that unexceptionally, where used to any extent whatever, they have produced death by doses wholly disproportionate to ordinarily cause such a result, yet it is but a little venture to further assert that were any of these compounds, of which either of the above facts has not been proven to be true, to be investigated thoroughly by experimentation in the lower animals, doubt would no longer exist of the correctness of this belief.

A most interesting question here arises as to the *modus operandi* by which anæsthetics produce death, and one, indeed, which has constantly been in the minds of those particularly interested in these compounds, and consequently, as Reeve writes regarding chloroform, "we have had explanations without number, hypotheses the most untenable, and theories the most fantastical; ingenuity has been taxed to the utmost in the formation of some of them, and logic torn to tatters." Thus we have had theories depending upon mechanical, chemical, and physiological effects; stoppages of the air-passages with mucus, or by the falling back of the tongue; impurity of the compound used; idiosyncrasies of the patient; abnormal condition of the system; degree of concentration of the vapour; emotion or peculiar mental condition of the patient, such as fear of the possible consequences of the inhalation; improper methods of administration; the greater impressionability of the heart at times than at others, etc. And, as to the cause of death, about as many theories and as diverse have been advanced. But, without entering into all this distressing detail, it is only necessary to state that it is conceded that whatever may be the conditions favouring death, it does occur practically from either asphyxia or syncope, and that the latter condition may be the result of either a direct action on the heart, or by the inhibition of the heart through a stimulation of the inhibitory apparatus. But doubt can no longer exist that death in man in a vast majority of cases is the result of a paralysis of the heart itself by a direct local action, and not of a reflex nature by acting on the inhibitory nerves. The former has been proven; the latter not. It is also equally certain, except in cases where the vapour has been administered for a prolonged period in very dilute form, that death very seldom is the

result of asphyxia, so that, practically, sudden deaths are due to cardiac paralysis.

Just why it is that the heart appears to be more impressionable at some times than at others, and why a person may be safely anaesthetized several times with chloroform, and on a subsequent occasion and under similar circumstances perish during its administration, is a question which has called forth many answers, some of which are as fanciful as the processes advanced to account for the deaths themselves. The whole answer *practically* can be simply and satisfactorily contained in the single word—*dosage*. It is one thing, as we all know, to give a man a grain of morphia in divided doses and spread out over several hours, and another to give him the whole at a single dose; and just as true is it, that it is one thing to give a drachm or two of chloroform in a few inhalations, or to give it slowly during a period of some minutes. And while it is one thing to give a medicine hypodermically or by the stomach, it is yet another (in effect) if given intravenously; and especially so, in regard to medicines affecting the heart or nervous centres; and any one who has watched the blood-pressure of animals under the influence of chloroform must have been struck with the remarkable variations and the diminution of heart-beats which occur after each fresh administration, and of the sudden deaths often occurring immediately after, while, if the drug has been given by the stomach or hypodermically, these remarkable phenomena are comparatively absent. The drug when given by inhalation is absorbed so rapidly that practically it acts as an intravenous injection, and reaches the heart in a state of concentration almost as great; where, on the other hand, it must be slowly absorbed from the stomach or subcutaneous tissue, the drug reaches the heart in such a dilute condition as to be unable to make such a decided impression, and as a consequence when death ensues it is from asphyxia, the same as when the vapour of chloroform is given very dilute and for a prolonged period. Reeve (*Am. Jour. of Med. Sci.*, p. 199, July, 1880) says, that “we find no such idiosyncrasies in regard to other medicines,” and that “opium, strychnia, and arsenic never cause death when administered in ordinary doses.” Although this is not by any means a parallel case, because neither of these medicines is ever administered either by inhalation or by intravenous injection, nor are they decided cardiac depressants, yet deaths have occurred from the use of morphia in ordinary doses, when given hypodermically; for a death ensued in one case from an injection of one-sixth of a grain. Just now I recall a better instance, and in connection with apomorphia; a drug which promised to be the most valuable emetic of the Pharmacopœia, but which has been almost entirely abandoned for therapeutic purposes. This drug was asserted by some of the early investigators not to affect the heart or arterial pressure, but more recently the reverse has been found true (and conclusively proven by my own experimentation). In clinical medicine such alarming symptoms of a syncopal condition

and threatening collapse were induced by "*very small doses*" (ordinary doses), that it is never used in this country as an emetic except in cases of extreme emergency.

Doubtless, if time permitted such a laborious research in the literature before me, similar instances could be found where other cardiac depressants acted in this way,¹ and scarcely anything could be more safely predicted than that, if it were the custom and practicable to give this class of remedies by inhalation or by intravenous injection, deaths from them would be proportionately as great as from the popular anæsthetics under consideration; and there likewise can be no doubt that the reason they are looked upon as being safe is simply because they are never given by the above method, or in such doses as to produce such a profound impression on the system as is necessary to produce in anæsthetization; and hence they are absorbed relatively so slowly as to reach the heart in an exceedingly dilute condition, as already stated. An example illustrating the difference in the effects of intravenous and subcutaneous administration of the same amounts, I quote from my experiments with apomorphia (*Phil. Med. Times*, Dec. 1879) on animals in which the heart was sepa-

¹ Since the above was put in type, the writer is enabled to cite several instances in corroboration of this belief, and which are only the more valuable because of their illustrating the truth of it in three of our principal cardiac depressants. The first is a death which occurred in an adult in three hours from five grains of the fresh extract of aconite (Pareyra and Perrin, in *Buchner's Report für die Pharm.*, No. 68, p. 199, and *Med. Chir. Rev.*, Oct. 1839, p. 544; quoted by Tucker, *N. Y. Journ. of Med.*, 1854, i. p. 230). Two others took the same amount and received the same antidotal treatment and recovered. Tucker does not state what extract it was, whether of the root or leaves, but as it was probably the latter, and as the usual therapeutic dose is one or two grains, and twenty grains or more have been used during the day, it appears to be an interesting case for us. It will also be remembered that three drops of the saturated tincture of the root caused alarming symptoms (*National Dispensatory*, 1880, p. 97). This tincture (Flemings's) being two-thirds the strength of a fluid extract gives the amount of the drug in the dose taken as equivalent to one grain of the pure drug, or equal in a physiological point of view to from four to six grains of the leaves, or from a half to three-fourths of a grain of the extract of the leaves of the British Pharmacopœia. If the first case is not altogether a fair one as an illustration, because of the uncertainty of the preparation used, yet it will be admitted that the last one is. Headland (*Lancet*, July, 1856) gives an instance where fifteen drops of the tincture nearly proved fatal. A case is reported of a medical student (Andral's *Clinique Médicale*, Spillan, 1836, p. 698; quoted by Taylor, *Guy's Hospital Reports*, 1857, p. 415) who died in four hours from the effects of two grains of tartar emetic. Another is given by Richelot (*Ibid.*) of death in a child of four years from one-third of a grain. Moreover, Noble states (*Guy's Hosp. Rep.*, 1857, p. 415) that prostration and collapse followed in four cases of infants from ordinary doses. I have not yet seen his original paper. Stillé quotes a case of a woman in whom alarming symptoms were caused by half a grain. Nunnally, from the results of a series of experiments on animals with hydrocyanic acid (*Med. Gaz.*, xl. 1837, p. 508), apprehends that the same creature is "liable to be seriously affected by a dose which at another time would produce but little effect." I will take occasion to resume a discussion of this subject at an early day.

rated from any central nervous influence, and so practically isolated, where after a subcutaneous injection no effect on the arterial tension was apparent, yet after an intravenous injection of the same amount, the arterial pressure was decidedly reduced, showing that although in both cases the dose was the same *apparently*, yet *practically* it was vastly different, and while it was evident that repeated subcutaneous injections could be borne with relative freedom from danger, on the other hand, regarding intravenous injections, it must be obvious that the reverse is true. That this argument is equally applicable to anæsthetics needs no further comment.

Moreover, there can be no doubt that the heart and other parts of the system, but especially the former, are more readily influenced at times by impressions, both intrinsic and extrinsic, than at others, and particularly so in those persons possessing a nervous temperament; and it is not an uncommon thing for such individuals to experience, on some occasions, a palpitation, or some vague or indefinable sensation about the heart, while at others, under similar circumstances, they would appreciate nothing of the sort. If, therefore, the heart and other vital parts are at times more susceptible, and more readily influenced by mental or other intrinsic impressions at certain but indefinite periods, why is it not probable that they are more susceptible at these periods to extrinsic influences, such as medicines? If this is so, and we probably have good illustrations of the truth of it in the instances already given, it is not difficult to conceive how the same dose, under apparently similar circumstances, may have double the effect it would have had on other occasions. As, for instance, let us illustrate the resistance of the heart to a given drug as being 10: if, now, the resistance is reduced to 5 by causes which we do not as yet understand, it is readily understood how the same dose will produce a given effect in the first instance, and double the effect in the second. If we now superadd to this changeableness of the impressionability of the heart a second factor, as shown in the very excessive variability of the degree of concentration of the vapour inhaled, the subject is made still more comprehensible, and it certainly requires no stretch of the imagination, when the many surrounding and modifying conditions are considered, to understand how it is that some inhalations may contain a very large percentage of the anæsthetic, and others relatively less, and, as a consequence, how a comparatively larger quantity may thus reach the heart at one time than at others. For it must be obvious, when we consider these conditions attending the administration of an anæsthetic, that the drug does not reach the heart in a steady supply, but gaining entrance into the pulmonary acini in an ever-varying degree of concentration, sometimes in large, and at others in small quantities, it must be certain that it reaches the blood in similarly varying proportions, because it finds its way into the circulation immediately, and, as a consequence, its action on the organism must then be analogous to repeated

intravenous injections of similarly varying amounts. For the sake of illustration, let us assume that when a given anæsthetic is administered the depressant effect on the heart is 10, and that now, as a result of the modifying conditions, the average degree of concentration of the vapour is doubled, is it not evident that the depressant action on the heart will be doubly felt? And now let us suppose we have a condition of the system when the heart's resistance is only half the normal, and we have the average degree of the concentration of the vapour considerably increased, it is readily conceivable as to how death may supervene.

To reiterate : it therefore must be apparent that we have here two important and self-evident factors, representing, respectively, two modes by which dosage is materially affected, and in accounting, in part at least, for the capriciousness in the action of chloroform and other cardiac depressants at different times under apparently similar circumstances, and a satisfactory explanation of the reason of their acting on such occasions altogether out of proportion to the dose used, and of the occurrence of death from ordinary anæsthetic doses.

Further, when we have a compound acting on the heart as a depressant, of a probable loosely molecular combination, which is liable to undergo under favourable conditions a decomposition in the blood, and of a composition which contains an element which, in a free state, is even more deleterious to the heart than the preparation itself, we certainly have added still another dangerous property.

It seems opportune in this connection to say a word in reference to the action on the nervous system, for we also have instances of the capriciousness of the action of anæsthetics, and of deaths as a result of *shock*, which are attributed to a sudden overwhelming of the nervous centres, and are, therefore, but other instances illustrating what was stated with particular reference to the heart in a previous paragraph. But the nervous system appears to be more strongly fortified against these sudden parietic impressions than the heart, and, as a consequence, death so seldom results from this cause, and as without exception probably every anæsthetic is capable of causing such an effect, it is obviously one of the dangers we must anticipate in the use of these compounds, but which we cannot guard against or expunge in our choice of preparations.

Therefore, the dangerous properties of anæsthetics, *i. e.*, those properties which we can avoid in our selection of a compound, resolve themselves, practically into decided depressant effects on the heart and on their containing toxic elements in their composition which may further, and possibly more powerfully, deleteriously affect the system by becoming liberated; and just such properties we find possessed by the group of preparations under consideration. It is taken for granted, of course, that compounds having such dangerous properties as some possess by causing an intense degree of irritation in the lungs and air-passages, etc., would undoubtedly

be avoided if for no other reason than the impracticability of administering them.

It may be said, however, that beneath the truth the writer is burying the truth, in so far that many other anæsthetics have been used not belonging to the above group, of which nothing has been said, and which also act as cardiac depressants, hence, that it must follow that this property of depressing the heart is not one peculiar to any class of anæsthetics, but a very general one. Admitting that other anæsthetics may induce cardiac paralysis before asphyxia is produced,—and it must be acknowledged that certain of them have a special tendency in this direction, such as hydrocyanic acid and creasote, the same as certain of the chlorinated compounds, such as the ethylidene and ethylene chlorides show a more decided tendency to the respiratory centres, but which is readily explained when we consider that the heart is so depressed as to be ineffectual in supplying the respiratory centres with blood,—yet the rule appears to hold good, and, to facilitate a comparison of these two classes of compounds, they are here placed in parallel columns :—

*Chlorinated, Brominated, and Iodated
Anæsthetics.*

Chloroform, CHCl_3 .
Chloral hydrate, $\text{C}_2\text{HCl}_3\text{OH}_2\text{O}$.
Carbon dichloride, C_2H_4 .
Carbon tetrachloride (chlorocarbon) CCl_4 .
Bromoform, CHBr_3 .
Ethyl chloride (chloric ether), $\text{C}_2\text{H}_5\text{Cl}$.
Ethyl iodide, $\text{C}_2\text{H}_5\text{I}$.
Ethyl bromide, $\text{C}_2\text{H}_5\text{Br}$.
Ethylene bichloride (Dutch liquid), $\text{C}_2\text{H}_4\text{Cl}_2$.
Ethylidene bichloride (ethydenic chloride), $\text{C}_2\text{H}_4\text{Cl}_2$.
Iodoform, CHI_3 .
Ethylene bromide, $\text{C}_2\text{H}_4\text{Br}_2$.
Methylene bichloride, CH_2Cl_2 .
Butyl chloride, $\text{C}_4\text{H}_9\text{Cl}$.
Methyl chloride, CH_3Cl .
Isobutyl chloride, $\text{C}_4\text{H}_9\text{Cl}$.
Methyl iodide, CH_3I .
Amyl iodide, $\text{C}_{10}\text{H}_{19}\text{I}$.
Amyl chloride, $\text{C}_{10}\text{H}_{21}\text{Cl}$.

Miscellaneous Anæsthetics.

Aldehyde, $\text{C}_2\text{H}_4\text{O}$.
Benzole, C_6H_6 .
Coal gas.
Creasote, $\text{C}_6\text{H}_6\text{O}$.
Carbonous oxide, CO .
Carbon bisulphide, CS_2 .
Ethyl oxide (ether), $\text{C}_4\text{H}_{10}\text{O}$, or $(\text{C}_2\text{H}_5)_2\text{O}$.
Ethyl, acetate, $\text{C}_2\text{H}_3\text{O}_2\text{C}_2\text{H}_5$.
Ethyl, methylate, $\text{C}_2\text{H}_5\text{O}(\text{CH}_3)_2$.
Ethyl, nitrate, $\text{C}_2\text{H}_5\text{ONO}$.
Ethyl, formate, $\text{CHO}_2\text{C}_2\text{H}_5$.
Acid, hydrocyanic, $\text{C}_2\text{N}_2\text{H}$.
Hydrogen sulphide, SH_2 .
Naphtha.
Nitrous oxide gas, N_2O_2 .
Olefiant gas, C_2H_4 .
Essential oils, $\text{C}_{10}\text{H}_{16}$.
Pyrrol, $\text{C}_4\text{H}_5\text{N}$.
Acetone, $\text{C}_3\text{H}_6\text{O}$.
Amylene, C_5H_{10} .

While these two classes represent the halogen and miscellaneous compounds respectively, yet were two other classes formed from them as representing syncopal and asphyxiating anæsthetics, or those having a decided tendency to depress the heart and those whose tendencies are to compromise the respiratory function, scarcely much change would be made, and with but few exceptions the above division would stand as it is. And while it is to be seriously regretted that our knowledge of the physiological actions of these compounds is so grievously inadequate, and that of

such a small percentage of the whole number we have scarcely sufficient information to be able to assert positively what their action is, yet we do know that every one of the halogen anæsthetics which have been investigated in reference to their action on the arterial pressure and as to their mode of producing death, have been found to both diminish the blood-pressure and paralyze the heart; and that probably at least sixty per cent. of the deaths from chloroform have been due to arrest of the heart; while in regard to the miscellaneous anæsthetics, it is undoubted that some of them do diminish the arterial tension and depress the heart, and will cause death by cardiac paralysis; yet, there seems to exist that unmistakable predominant tendency to produce death by asphyxia and not by sudden cardiac arrest, although with those which possess to any marked degree a cardiac depressant action, a sudden failure of the heart is likely to occur, as with the halogenated compounds. Every anæsthetic has a decided tendency to cause death by asphyxia, and the reason of this is very apparent when we consider how greatly all the functions of animal life are diminished, but particularly those of the nervous system, whose excito-motor functions especially must always be very decidedly lessened in anæsthesia; and when we have such a serious interference with the transmission, reception, and origination of impulses, as is invariably present in complete narcosis, it is not difficult to understand how it is that any anæsthetic possessing this powerful depressant power may, if given in excessive doses (a too concentrated condition of the vapour inhaled), or in states of the system when these centres are in an abnormally impressionable condition, cause a sudden paralysis, such as has followed the use of ether, which, as is generally admitted, is beyond doubt, with but one exception, the safest of all anæsthetics in general use, and the least liable to cause death without a warning such as the merest novice must appreciate. Yet because it must follow that every anæsthetic may and will cause death by asphyxia, the same universal rule does not apply to them in regard to their effects on the circulatory system, and instead of its being the rule to decidedly depress the heart and blood-pressure, excluding the chlorinated, brominated, and iodated compounds, it is probably the exception; therefore, it must be evident that while in the anæsthetic compounds such as creasote and hydrocyanic acid, their decided depressant action on the heart is an accidental concomitant associated with their other physiological properties, on the other hand, in the halogen preparations the action appears to be so universally existent as to suggest that there must be some inherent toxic principle or principles which enter into the composition of each, and is common to all of them, and which endows them with this one dangerous property.

That this toxic principle is not to be found in the radicles forming the bases of these compounds, but in the negative elements, is obvious for several reasons, and some years ago Richardson reached a similar con-

clusion regarding one of these particular divisions, and stated that he deemed all *chlorinated* compounds dangerous. More recently, Squibb has warned us to be careful in the use of ethyl bromide, for fear of inducing brominism; and we know that by giving the ethyl iodide by inhalation, the system is rapidly brought under the influence of iodine. Now, for instance, let us take ether, an oxide of ethyl, and substitute for the oxygen bromine, and what is the result? The ether, which was before a cardiac stimulant, and would almost without exception cause death by asphyxia, has now become excessively increased in power, and the half drachm of the compound will produce an effect more intense than ten or twenty or more times the original amount, and, instead of a cardiac stimulant, we have a decided depressant, and instead of having deaths following from slowly induced asphyxia, we have deaths occurring from cardiac arrest, and sudden, overwhelming, and unanticipated results following its use. Further, take olefant gas, and we find that when inhaled it possesses but feeble anæsthetic powers and causes death by asphyxia; but add bromine or chlorine to it, and we have powerful anæsthetics and undoubted cardiac depressants.

Considering all these things, there can be but little doubt that the dangerous properties, if not the degrees of potency, of anæsthetics, are decidedly enhanced by the addition of either of the halogens, and it is not at all improbable that these ethers are mostly loosely molecular compounds, some of which are more readily decomposed in the system than others, and that their degree of dangerousness, *cæteris paribus*, depends upon the relative amount and relative physiological power of either of these halogen principles which enter into the composition of any one of them, and upon the degree of fixity of the molecules.

ARTICLE V.

A CASE OF ABSCESS OF THE LIVER, COMPLICATED WITH EMPYEMA; OPERATION; CURE. By WALTER MENDELSON, M.D., House Physician to the New York Hospital.

MARY G., aged 32, a native of England, married, a labouring woman, was brought to the hospital on October 9th, 1880, and gave the following history:—

Two weeks previous to admission, she began to suffer from a sudden sharp pain in the right side of the chest, the pain being made worse by motion or cough, or by lying on the right side. Patient also had a hacking cough, with slight mucous expectoration, and suffered a good deal from shortness of breath. This condition persisted for one week, when she was seized with a chill followed by profuse sweating. Chills and sweats continued to recur with tolerable frequency, and the patient lost her strength

and flesh with great rapidity. The cough also increased in severity, and the expectoration became muco-purulent in character.

On admission the pulse was 116, the respirations 36, and the temperature 102.8° . The patient was extremely exhausted, being almost too weak to speak. She lay on her back, propped up in bed, breathing very cautiously, as if in great pain, and wearing an expression of keen anxiety. Emaciation was very marked, and the patient presented all the appearances of having been used to much hard work and poor food.

Physical examination of the thorax showed the respiration on the left side, both in front and behind, to be vesicular, but exaggerated in degree. On the right side behind, from about two inches below the inferior angle of the scapula to the base of the chest, there was loss of tactile fremitus and flatness on percussion. Auscultation of the same region revealed ægophony and bronchophony. Above the inferior angle of the scapula the percussion note was dull-tympanitic, and on auscultation a rude respiratory murmur was heard.

The upper border of the liver was at the sixth intercostal space; the lower on a level with the umbilicus.

A hypodermic needle was inserted into the pleural cavity in the eighth right intercostal space, and some very thick bloody pus withdrawn.

The woman was ordered brandy \mathfrak{z} ss, every three hours, and quinia sulphate gr. v, three times a day. The pulse continuing very feeble, she was ordered tinct. digitalis \mathfrak{m} .xx. every three hours during the night, and was also sponged with a weak solution of tinct. belladonnæ to allay sweating, which was very profuse.

Oct. 10. The patient's dyspnœa was still very severe. At 9.15 A. M. resp. 48; temp. 104.4° . At 12 M. it was decided to aspirate the chest, although the patient's condition was such as hardly to allow of hope for a favourable issue. The largest needle, No. 4, of Dieulafoy's aspirator was inserted twice; first in the eighth, and then in the ninth intercostal space, about in a line with the angle of the scapula, the woman being propped up in bed with pillows. Each time only a drachm or two of very thick pus was drawn, owing to the needle becoming clogged, and as the patient became quite faint, and the pulse very feeble, further attempts were abandoned. At 2 P. M. the needle was again inserted in three different places, but not more than two ounces altogether were withdrawn from the pleural cavity. The pus was of a thick, viscid nature, and contained more or less brownish blood.

12th. Temp. 100.2° . Patient slept very little at night, being troubled by a persistent cough, which opium only in part relieved. Vomited considerably, and sweated profusely. Complained of but little pain. Urine was normal.

16th. Very little change occurred in patient since the last date: the temperature averaging about 102° , the respirations about 50, and the pulse about 115. On the morning of this day there was noticed, for the first time, in the right hypochondrium, just above and to the right of the umbilicus, a slight swelling. This was rather firm to the touch, and the seat of some tenderness.

19th. The tumour had become more distinct, being now as large as a goose's egg. The base was indurated and sloping, merging into the liver, whose lower border could be distinctly felt below it. The summit was crater-like, the basin of the crater being soft and fluctuating. There was no redness of the skin over the swelling; its contents could not be evacu-

ated by firm and persistent pressure, nor was there any impulse communicated to it by coughing. Examination of the chest showed the breathing and voice to be more resonant and amphoric in character, and the percussion note tympanitic, where it had formerly been dull. (Pneumo-thorax.)

21st. The tumour was slightly larger, though no signs of pointing were seen. Temp. 99° at 9 A. M. Patient still sweated profusely, which was in part checked by atropia gr. $\frac{1}{100}$, by the mouth, at frequent intervals.

23d. The tumour was less prominent and the edges more firm. The expectoration was rather scanty and whitish, and fibrinous in character. The sweating continued in spite of atropia. The range of temperature was lower, being from 99° to 101° .

28th. Patient sat up for a short time, her general condition being greatly improved, the sweating having become much less.

Nov. 2d. On this morning about one o'clock, patient suddenly awoke with great dyspnoea and coughing. She expectorated large quantities of purulent material, having a very fetid odour. The expectoration continued more or less profuse all day, the dyspnoea gradually subsiding.

5th. Expectoration still continued, and was unchanged in character. The tumour in the epigastrium was nearly imperceptible and quite soft to the touch. Patient was ordered cerium oxalate to control cough.

12th. The temperature had not been above 100.6° for the past four days. General condition was much improved.

18th. This morning the tumour was noticed to have reappeared, and was larger in size than before. It occupied the same position, was somewhat rectangular in shape and not so conical as at first. It extended one and a half inches to the left and one inch below the umbilicus. Its right border was one and a half inches beyond the mammary line. Its upper limit was at the costal edge. It measured about five and a quarter inches transversely, by four and a quarter longitudinally. As in the beginning, no impulse was communicated to it when the patient coughed, nor could its contents be evacuated by firm and continuous pressure. The tumour was somewhat tender to the touch, and the skin over it had a boggy feel. Fluctuation was very evident. Poultices were ordered, and calcium sulphide gr. $\frac{1}{4}$ three times a day administered internally.

20th. The tumour was aspirated with a hypodermic syringe, and a few drops of very thick odourless pus obtained. Temperature varied from 100° to 102° ; pulse about 105; respirations 36. The expectoration on this day was noticed to have an orange-yellow colour, as if tinged with bile. (Unfortunately no chemical examination for bile was made.)

22d. By this time the tumour had increased considerably in size, its growth having taken place mainly to the left of the umbilicus. The skin over it had a brawny, hard feel, and was quite red and ecchymotic looking. The patient's breath was horribly offensive, having the same odour as her expectoration.

As the abscess showed such decided signs of pointing, it was determined to operate, which I did at 11 A. M., the patient being etherized. At 9 A. M. pulse had been 112, respirations 36, and temperature 101.8° .

An incision one and a quarter inches in length was made just above and one inch to the right of the umbilicus in the softest part of the tumour. After a rather superficial cut the pus was reached, and poured out in great quantities, about a pint or more discharging in a few minutes. The pus was thick, viscid, sanious, and clotted. It was mixed with portions of bright yellow pus and shreds of broken-down tissue. It was entirely

free from odour. The cavity was washed out with a solution of carbolic acid (1 to 40 of water), and on introducing a finger through the wound, the abscess was found to consist of two portions: one, the main cavity, lying to the right of the median line, and having the size of a very large orange; the other, a smaller one, about the size of a pigeon's egg, just to the left of the median line, the two being freely connected by a canal running transversely under the *linea alba*. The liver tissue could be felt projecting into the cavity, in hard, nodulated masses, covered with a pulpy material, which was easily scraped away with the finger. It was impossible to touch the bottom of the abscess with the finger, but a probe could be introduced for about four inches in a direction backwards, upwards and outwards.

A large drainage-tube was inserted and the wound covered with a compress wet in a 1-40 solution of carbolic acid, over which a piece of mackintosh was laid and the whole secured by a carbolized gauze body-bandage. A drachm of brandy and Magendie's sol. m_v were given hypodermically.

At 1.30 P. M. the pulse was 118, the respirations 32, and the temperature 98.6° . At 10.30 P. M. pulse 120, respirations 34, temperature 96.6° . An ounce of brandy was administered and hot bottles were applied to the body.

23d. At 8.30 A. M., pulse 104, respirations 34, temperature 98.4° . Patient suffered little or no pain and slept well during the night. The abscess was dressed to-day by washing it out by means of an irrigator, with a weak solution of carbolic acid in warm water. A considerable amount of shreddy material and some pus came away. The discharge was perfectly odourless. The pus which came from the abscess on first opening it was examined by Dr. George L. Peabody, pathologist to the Hospital, who made the following report: "Pus in bad condition, with many broken-down cells and a great deal of detritus. Also many large, round cells, three to four times as large as pus cells, containing considerable pigment and some fat globules." Nothing that could be distinctly identified as liver cells was found.

27th. The first rise of temperature occurred on this day at 4 P. M., the thermometer registering 100.2° . The cavity had been washed out every day, and had very rapidly decreased in size, not being more than half its original dimensions at this date. The patient, with the exception of some cough and occasional vomiting, did very well.

Dec. 27th. The patient by this time had been up and about the ward for a month, had gained in weight and strength, and was in excellent physical condition. On two occasions only was there a rise of temperature; once to 100.2° , and again to 102° . The abscess healed entirely, with the exception of a small sinus about an inch and a half long, which discharged a few drops of serum a day, and for the care of which the patient did not want to stay any longer in the hospital. Her cough and expectoration had ceased entirely. Physical examination of the chest revealed good vesicular murmur all over, except on the right side toward the base in the axillary line, where it was feeble and the voice-sounds distant. The lower border of the liver was still at the umbilicus, being bound down by adhesions. Being anxious to go, she was discharged as cured on this date. At no time during her illness had she been jaundiced.

Remarks.—The woman had in all probability an abscess of the liver before entering the Hospital (Oct. 9th), as the enlargement of her liver,

as measured on admission, showed. This abscess set up, by contiguity, a simple pleurisy, which lasted a week. At the end of that time the pleurisy became an empyema, as it would be quite likely to do in one having a considerable deposit of pus anywhere in the body, and run down by an exhausting disease.

Physical examination of the chest ten days after admission (Oct. 19th) showed that the empyema had become a pyo-pneumo-thorax. As there had not been anything to call especial attention to the chest, no sudden attack of great dyspnœa, it is more than probable that the air entered the pleural cavity gradually through a small and valvular opening, for although the chest contained pus, as was shown by aspiration on the day of admission, the woman did not expectorate any more than usual until two weeks after the discovery of the pyo-pneumo-thorax (Nov. 2d), when she was suddenly awakened in the night with great dyspnœa, and expectorated large quantities of very fetid pus, the expectoration continuing during the next day.

The bad odour of the material expectorated would go to confirm the previous presence of air in the pleural cavity, and the suddenness of its appearance would indicate that the opening through which air could enter into the pleural cavity was of such a nature (at least for a time) as to prevent the pus from escaping from the latter into the lungs. At this time the expectoration was simply purulent, and had not the appearance of being stained with bile. It is worthy of note that in the interval the epigastric tumour, which was observed (Oct. 16th) three days before the pyo-pneumo-thorax was discovered, had been diminishing in size, and a few days after the pus burst into the lung was almost gone. It would be hard to explain this subsidence of the tumour, except by supposing that it had discharged into the pleural cavity. Two weeks later, however, (Nov. 18th) the tumour was noted as having reappeared and to be larger than ever, and also that the sputum contained what appeared to be bile.

A few words in regard to the tumour. On its first appearance various theories relating to its nature were advanced. It seemed in the beginning as though it might be the gall-bladder, for it was in the place where this organ appears when distended, and was soft and globular. Careful exploration, however, revealed the sharp edge of the liver below the tumour, a condition which of course could not exist had it been the gall-bladder. As the edges became more indurated it was supposed to be an abscess in the abdominal walls, the result of the pus from the empyema making its way downward, for, be it observed here, there was no suspicion of hepatic abscess when the woman was admitted, and all her trouble was referred to her empyema. Against this latter view was the fact that the abscess could not be emptied by pressure and received no impulse on coughing.

From the first the hepatic origin of the abscess had been strongly advocated, in view of the enlargement of the liver and the mound-like edge of

the tumour, caused probably by the adhesions formed between the liver and the abdominal walls.

When the tumour was incised (Nov. 22d), and after evacuating its contents, the finger was introduced into the cavity; of course no more doubt regarding its nature remained. The pus from the abscess did not resemble that spit up by the patient, for it was mixed with blood, and not fetid; nor did it at any time subsequently become so.

Shortly after the abscess was opened the cough became less frequent and the expectoration less copious, and finally ceased altogether. This might have been due to the general and very marked improvement which occurred in the health of the patient immediately following the operation, and to the withdrawal of the irritation from the right side of the chest, which the proximity of the tumour to the diaphragm must have caused; even though no direct communication between the former and the chest necessarily existed.

It would seem to me, therefore, that most of the evidence would lie in favour of the empyema and hepatic abscess being distinct, though correlated; the only marked evidence against this being the almost complete disappearance of the tumour for a while, and the presence for a short time of what appeared to be bile in the expectoration.

My chief grounds for supposing the abscess to be distinct from the empyema is the fact that the expectorated products of the latter were extremely fetid, while the pus from the former was perfectly odourless. It seems to me that had an opening, no matter how small or valvular in character, existed in the diaphragm, the putrid pus in the pleural cavity must have infected that in the liver.

Thierfelder, in vol. ix. of Ziemssen's "Cyclopædia," says that cases such as this one seemed to be are of rare occurrence, and quotes one (confirmed by autopsy) reported by Loewer in the *Berliner Klinische Wochenschrift* for 1864 (p. 461).

ARTICLE VI.

ON LYMPHATIC HEARTS AND THE PHENOMENA ATTENDING THE PROPULSION OF LYMPH FROM THEM INTO THE VEINS INTO WHICH THEY OPEN.

By THOMAS WHARTON JONES, F.R.C.S., F.R.S., Professor in University College, London.

THE object of this paper is: to describe the phenomena attending the propulsion of lymph from a lymphatic heart into the vein into which it opens; and to point out the difference in these phenomena from those which attend the propulsion of blood from the left ventricle of the heart into the aorta and large arteries.

Our minds being familiar with the pulsation of the arteries attending the propulsion of the blood into them, we are very prone to conclude that pulsation of the vein must, in like manner, be produced by the propulsion of the lymph into it from a lymphatic heart. It is a fact, however, that no pulsation of a vein is produced by the propulsion of lymph into it from a lymphatic heart. In the two cases, in which we can directly observe the propulsion of lymph into veins taking place, we see no distension of the vessels such as that exhibited by arteries when the blood is propelled into them by the stroke of the heart, and on which the arterial pulse depends. The reason of this is plain: for the conditions under which the lymph is propelled from lymphatic hearts into veins are quite different, as we shall see, from those under which the propulsion of blood from the heart into the arteries causing their pulsation, takes place.

It is to be understood that I am not referring to the phenomena attending the systole and diastole of the hearts themselves, for, of course, the pulsations of a lymph-heart are similar to those of the blood-heart. What I wish to maintain is this: that whilst the propulsion of the blood into the aorta by the contraction of the left ventricle distends the aorta and large arteries, so that a pulsation is felt by the finger applied over the vessel—the propulsion of lymph, on the contrary, into a vein, as observed under the microscope, does not cause distension of that vessel such as would indicate to the eye that anything of the character of a pulsation capable of being felt with the finger, supposing the vein large enough to be touched, was a result of the propulsion of the lymph into the vein.

Preparatory to entering on the proper subject of this paper, I beg to call attention: 1st. To the conditions under which the propulsion of blood into arteries causing them to pulsate takes place. 2dly. To the conditions under which regurgitation of blood into veins causing the venous pulse takes place. 3dly. To an inquiry as to whether pulsation attends the rhythmical contractions of the veins of the bat's wing, and the acceleration of the flow of blood in those vessels thereby occasioned.

First, then, as to the conditions on which the arterial pulse depends: By the contraction of the left ventricle of the heart, the blood is propelled into the aorta and its larger ramifications. These vessels thereby become suddenly distended, and it is this sudden distension which is felt as the pulse by the finger on being applied with a little pressure over an artery.

The walls of arteries, having elastic and muscular tissues entering into their structure, are endowed with both the physical property of elasticity and the vital property of contractility—contractility of the kind which is tonic or continuous in its action, not rhythmical. By the combined operation of these two forces—elasticity and contractility—inherent in their walls, the arteries during the diastole of the ventricles, react and close in on the blood with which they had become distended at the time of the systole of the ventricles. The effect of the pressure thereby exerted on

the blood is to force it onwards in its course through the smaller arteries and capillaries into the veins; regurgitation into the ventricle being prevented by the semilunar valves of the aorta.

In consequence of the onward flow of the blood in the smaller arteries being in a great measure dependent on the pressure exerted by the reaction of the elastic and tonically contractile walls of the aorta and larger arteries on the blood distending them, during the diastole of the ventricles, the pulse of those smaller arteries is subsequent, by an appreciable interval of time, to that of the larger arteries.

In the web of the frog under the microscope, the conditions for pulsation are observed to be manifested in a small artery by its dilatation from distension with blood, and if the vessel be tortuous, by its becoming, at the same time, more bent at the bendings.

The constrictions and dilatations which the artery in the rabbit's ear is seen to undergo, have been erroneously described as rhythmical, and the artery itself viewed as performing the function of an auxiliary arterial heart; it being alleged that the artery by its dilatation receives and partly draws in the blood, whilst, by its contraction, it propels the blood onward in its course to the capillaries, and thus promotes the circulation. This is, however, entirely a mistake, the contrary being the case. The artery of the rabbit's ear is not endowed with rhythmical contractility. Its contractility is merely tonic like that of other arteries, and its pulsations, like those of other arteries, are the consequence merely of its becoming distended by the blood propelled into it from the heart.

When constrictions or dilatations of the artery do take place, the effect is that the supply of blood to the ear is correspondingly diminished or increased for the time, as is the case in other organs when their arteries become constricted or dilated. The constriction of the arteries in fact is propagated from branches to trunk so as to drive the blood back towards the heart instead of onwards through the capillaries into the veins. The only peculiarity in the rabbit's ear is that the alternations of constriction and dilatation of the artery are frequent and easily observable.

I come, secondly, to consider the conditions on which the venous pulse depends :—

When the right auricle is, by its contraction, propelling the blood into the right ventricle, a portion tends to regurgitate into the superior cava, there being no valve at the mouth of that venous trunk. The stream of blood in the superior cava towards the heart meeting this backward flow, checks it; and between the two opposite streams the vein and its feeders become distended. This distension taking place synchronously with the contraction of the right auricle, pulsation of the venous trunks may be felt at the time of that contraction.

The instance I have adduced is sufficient to illustrate the nature of the conditions on which the venous pulse depends. I need not, therefore,

stop to inquire how far the Eustachian and Thebesian valves are capable of opposing regurgitation—the former, into the inferior cava; and the latter into the sinus of the coronary veins; nor whether any pulsation of the inferior cava or coronary veins takes place.

We thus see that the arterial pulse and the venous pulse, both of them, depend on periodical distension of the respective vessels with blood, and that this periodicity is owing to the rhythmical contractions of the heart—in the case of the arteries to the contractions of the ventricles, and in the case of the veins to the contractions of the auricles. Whilst, however, the arterial pulse is owing to the forcible propulsion of blood from the ventricles into the arteries, the venous pulse is owing merely to a regurgitation of blood into the veins at the time of the contraction of the auricles.

As the venous pulse depends on the contraction of the auricle, and the arterial pulse on the contraction of the ventricle, the venous pulse and the arterial pulse are consequently not synchronous.

My third subject of preparatory inquiry is as to whether pulsation attends the rhythmical contractions of the walls of the veins of the bat's wing, and the acceleration of the flow of blood in those vessels thereby occasioned.

Though their walls contract rhythmically, the veins of the bat's wing do not pulsate. Of this I am assured by observing that the rhythmical contractions of the walls of those vessels in accelerating the circulation do not cause any sudden distension with blood of that section of the vein in which the flow is accelerated, such as would indicate to the eye that anything like a pulsation capable of being felt with the finger, supposing the vein large enough to be touched, could be the result. In large frugivorous bats, the veins are indeed large enough to be felt, but, on pressing one between my fingers, I did not perceive any pulsation, properly so called.

Conditions such as those on which pulsation, like that of the arteries, depends, do not exist in the case of the veins of the bat's wing. The stream of blood in veins being from branches to trunk, from narrower to wider channels, the veins in the bat's wing do not become suddenly distended with blood—the wider veins with the blood propelled into them by the rhythmical contractions of the walls of the narrower veins.

The effect of the rhythmical contractions of the walls of the veins, then, is merely rhythmical acceleration of the stream of blood, its general onward flow being still maintained, as in veins not possessed of rhythmical contractility, by the *vis a tergo* dependent on the heart's action.

I now come to the proper subject of this paper, which is, a description of the phenomena attending the propulsion of lymph from a lymphatic heart into the vein into which it opens; with an inquiry as to whether pulsation of the vein is produced by the propulsion of the lymph into it,

such as we have seen to attend the propulsion of blood from the heart into the aorta and its ramifications.

The only lymphatic hearts, the propulsion of lymph from which into their corresponding veins it has been as yet possible to observe taking place, are the lymphatic heart in the tail of the eel, and the anterior lymphatic hearts of the frog. The observation in both cases requires to be made under the microscope, though a low power is sufficient.

To speak first of the phenomena attending the propulsion of lymph from the lymphatic heart in the tail of the eel into the caudal vein.

The caudal venous trunk is formed by the inosculation of two trunklets, into the smaller of which it is that the lymphatic heart opens by a short duct near the junction.

By the contraction of the heart the lymph is so forcibly propelled into this venous trunklet, that the stream of blood in it is interrupted by the lymph-stream cutting through it. Colourless lymph thus wholly replaces the red blood as far as the caudal trunk, and in this vein itself the lymph-stream so far displaces the blood-stream entering it by its larger tributary trunklet as to occupy one side of the interior of the vessel for some distance in its course, until the blood and the lymph both at last become mingled.

During the diastole or relaxation of the lymphatic heart, the stream of lymph into the smaller tributary venous trunklet intermitting, the flow of blood in that vessel to the trunk of the caudal vein is resumed. Systole of the lymphatic heart, however, quickly ensuing, the stream of lymph again cuts through the blood-stream, and drives before it into the caudal venous trunk the small quantity of blood which had entered the tributary venous trunklet during the diastole of the lymphatic heart.

We have thus presented to our observation the phenomenon of small drops of blood or agglomerations of red corpuscles propelled in rapid succession, synchronously with the systole of the heart, in the colourless lymph stream occupying one side of the caudal venous trunk for some distance onwards, and looking, at first glance, as if they emanated from the lymphatic heart. That the drops of red blood did actually issue from the caudal heart was supposed by the late Dr. Marshall Hall, who discovered the organ. Under this erroneous impression, Dr. Marshall Hall, therefore, described the caudal lymphatic heart of the eel as an auxiliary blood-heart.

By my discovery of the true nature of the phenomenon, the caudal heart of the eel was proved to be a lymphatic heart.¹

The intermittent propulsion, by the mechanism and in the manner I have described, of small drops of blood or agglomerations of red corpuscles into and along the caudal vein on the side occupied by the lymph

¹ The Caudal Heart of the Eel a Lymphatic Heart, etc., *Philosophical Transactions*, 1868.

stream, gives the appearance at first sight as if the vein itself pulsated, but a little attentive observation is sufficient to satisfy us that the vein really does not pulsate. A little consideration also will lead us to perceive that the conditions under which the propulsion of the lymph into the vein takes place are not such as to permit of pulsation of the vessel. The vein, increasing in width in its course, cannot be distended by the lymph propelled into it at each systole of the caudal heart, as I have before argued.

Before my discovery of the true nature of the phenomena attending the propulsion of lymph from the lymphatic heart in the tail of the eel into the caudal vein, and the conclusive confirmation thereby afforded, that the caudal heart of the eel is really a lymphatic heart, nothing but contradiction prevailed on the subject. Similar contradiction prevails, I believe, at the present time respecting the veins into which the anterior lymphatic hearts of the frog open, and the phenomena attending the propulsion of lymph from the hearts into those veins. And this notwithstanding that I explained the whole subject-matter many years ago.

The demonstration of the veins into which the anterior lymphatic hearts of the frog really open, and the explanation of the phenomena attending the action of the heart, and the propulsion of lymph from them into the veins, to which I come in the last place, constitute the main object of this paper; and all the observations I have before made, were intended to prepare for the better elucidation of the subject to which I now beg to draw attention.

A frog being rendered insensible, its thoraco-abdominal cavity laid completely open, and the viscera—both thoracic and abdominal—pushed to one side, we can on looking into the side thus emptied—the left for example—and directing attention to the niche behind and below the extremity of the large transverse process of the third dorsal vertebra, observe the systole and diastole of the posterior part of the anterior lymphatic heart of the side under examination.

This observation may be made with the naked eye, but in order to see the stream of lymph entering the vein, into which it is propelled by the heart, it is necessary to examine the part under the microscope. And for this purpose, the skin of the back of the frog from over the scapular region requires to be removed in order to allow the transmission of light.¹

The vein into which the lymph is propelled lies at the posterior margin of the heart, near the large transverse process of the third dorsal vertebra already mentioned.

As the caudal heart of the eel opens into its vein by a short duct, so also does the anterior lymphatic heart of the frog open into its vein by a short duct. In neither case does the vein itself directly issue from the heart.

¹ Sometimes by the removal of the skin lymphatic spaces are opened into, and air may be drawn therefrom into the lymphatic heart—an accident which at once arrests the action of the heart and renders the experiment fruitless.

Viewing, then, the parts from the inside of the thorax with a simple lens of half an inch focus, we observe that when the lymphatic heart contracts, the lymph-stream propelled into the vein sweeps before it the blood in that vessel whilst the flow of blood in it from behind is arrested. At this moment, the lymph fills the whole of that part of the vein into which the heart-duct opens, so that the vessel appears at the place quite colourless. As soon, however, as diastole of the lymphatic heart supervenes, the flow of blood from behind becoming re-established, the lymph filling the vein at the place is, in its turn, driven onwards, though with less force than that with which it had, by its propulsion from the heart, swept the blood before it, while the vein becoming refilled with blood appears red.

Systole of the lymphatic heart now again ensuing, the lymph-stream thereby propelled into the vein sweeps forward the blood in that vessel as before, whilst the flow of blood from behind is arrested, and thus the same series of phenomena is repeated.

The propulsion of lymph from the anterior lymphatic hearts of the frog into the veins into which they open, the phenomena attending which I have now described, causes *no distension*, and, consequently, *no pulsation* of the veins any more than we have seen to be the case with regard to the propulsion of the lymph from the caudal heart of the eel into the caudal vein. We have seen how the apparent propulsion of drops of red blood from the caudal heart of the eel misled Dr. Marshall Hall into the supposition that the caudal heart of the eel is an auxiliary blood heart. Connected with the action of the anterior lymphatic hearts of the frog, there is a different but an equally misleading phenomenon, which consists in movements, synchronous with the systole and diastole of the hearts, exhibited by a large jugular vein (blackish from the quantity of pigment cells in its outer coat) in the neck on either side, which appears as if to issue from the lymphatic hearts anteriorly. This vein was first observed by the late Dr. Marshall Hall, who mistook it for an artery endowed with rhythmical contractility. Subsequently Johannes Müller, the late distinguished Professor of Anatomy and Physiology in Berlin, discovered the anterior lymphatic hearts, but erroneously supposing that the large black vein in the neck, on either side, I am speaking of, actually issues from the heart, he considered the movements of the vein as pulsations produced by the propulsion of the lymph from the lymphatic heart into it—the vein becoming turgid, as he thought, each time the heart contracted.

I have, however, shown, as already explained, by direct observation, that the anterior lymphatic heart of the frog pours its lymph by a short duct into a vein at its posterior border, and that no turgidity or pulsation of the vessel is thereby produced. Nevertheless, the vein in question, though it does not issue from the lymphatic heart, exhibits movements synchronous with the systole and diastole of it. The question, therefore, presents itself: What is the character of these movements?

If we watch the phenomenon carefully, we observe that at each systole of the lymphatic heart, the vein is drawn backwards as a whole, and that at each diastole the vein retracts into its former position. This rhythmical backward and forward movement of the vein longways is evidently owing to its being closely bound to the anterior part of the heart so as to be dragged by it in its contractions. The nature of the bond of connection appears to be this: The lymphatic heart is embraced anteriorly by the veins, which by their inosculation form the trunk in question, viz., on the outer border several small veins which are bound to the heart by its capsule of cellular tissue; and on the inner border, a large vein which is a continuation upwards and behind the large transverse process of the third dorsal vertebra of that vein into which the lymphatic heart really propels the lymph in the manner I have described. And now, in conclusion, let me express the hope that I have made it clear to demonstration: 1st, that the movements exhibited by the jugular vein of the frog, on either side, though synchronous with the action of the anterior lymphatic heart, are not pulsations produced by the propulsion of lymph into it, and that, in fact, the heart does not open into the said vein at all; and 2dly, that the vein into which the lymph is really pumped is seated within the thorax at the posterior border of the heart, and that the propulsion of the lymph into it causes no distension, and consequently no pulsation.

ARTICLE VII.

EMPHYEMA AND ITS TREATMENT.¹ By F. E. MARTINDALE, A.M., M.D., of Port Richmond, N. Y., Consulting Surgeon to the Child's Nursery and Hospital, Port Richmond.

I do not propose in the following paper to analyze the several factors that enter into the causation of empyema as a grave pathological condition, nor advance any new theory as to why pus should at any time be effused into the pleura rather than serum or lymph, during the course of an exceptionally severe pleuritis. It is enough for us to know, for the purpose hereinafter set forth, that such is the case, and that when it is, operative measures become an absolute necessity in the interest of the patient and his permanent recovery.

I purpose, however, viewing this pathological condition, or result, solely in connection with the several operative methods that have been proposed for its radical treatment in the past, and to illustrate, by a case in point, that method alone, which to my mind seems entitled to be regarded as a

¹ A paper read before the Richmond County Medical Society, New York, May 4, 1881.

positively radical treatment, and which in a large majority of cases promises an absolute and certain recovery to those operated upon.

The genesis of these or co-ordinate measures for the removal of effusions from within the thoracic walls dates back even to the time of Hippocrates. It may reasonably be presumed that accumulations of pus within the pleura were evacuated spontaneously in individual cases, then as now, and that where there were external evidences of its presence as shown by localized inflammations and pointing, the ancient surgeons incised the supposed abscess and thus, imperfectly no doubt, evacuated the contents of the pleura; in fact, there can be no question as to this operation having been occasionally performed during the time of Galen with more or less favourable results. At a much later period we learn that as physicians became more and more distinctly separated from surgeons, the spirit of opposition to operative interference arose, and this antagonism between the two branches of the profession may be recognized, even to as late a date as the year 1836, by reference to the Transactions of the Paris Academy, on that subject, for that year. In fact, it has only been in quite modern times that clear indications have been recognized, and precise methods adopted for operative interference in these cases, as exemplified in the more modern application of aspiration to their treatment.

This latter method was, for a considerable length of time, regarded as the *ne plus ultra* of surgical resource, and one that guaranteed more successful results in the removal of the purulent contents of the pleura than had before been obtained, but it failed in this, that it did not do it effectually enough to alter or modify the process of the conversion of lymph into pus by the secreting membrane of the pleura, and hence its present disuse in those cases. Laennec, Trousseau, Reybard, and still later Marrote, well known as advanced thinkers among the leading French physicians of their day, did not hesitate to advise and practise the method of puncturing pleuritic effusions whatever their character, as can be seen by reference to papers published in the Bulletin of the Academy of Med., Paris, 1846, and the Transactions of the Society of the Hospitals of Paris, 1864. Trousseau regarded the operation for paracentesis as an exceedingly grave one even in sero-fibrinous effusions, and declares it should be had recourse to only "when there is danger to life from immediate suffocation, or when the effusion is very large;" Marrote, in the paper read before the Society of the Hospitals of Paris, '64, and just referred to, is the first to make a clear distinction between the treatment of sero-fibrinous and purulent effusions, and declares "that the radical operation of incision is the only one in purulent effusions that is at all likely to lead to a cure." Bowditch was undoubtedly the first to introduce aspiration into practice as a reliable therapeutic agent, and a paper published by him in the *American Journal of the Medical Sciences*, as early as 1852, advises its application to all thoracic effusions, and in a later one, published in the same Journal in

1864, denies that any ill results are likely to follow, or that purulent effusions cannot be effectually withdrawn through the capillary tubes provided for that operation. Fraentzel, an eminent German author, however, in his article on "Pleuritis," in Ziemssen's *Cyclopædia*, declares that "they would certainly give the preference to the new method of operating by single incision, with canula, and washing the pleura, who have seen as I have, as many as eighteen cases, in which the then radical operation by aspiration had been performed, with only two recoveries, and one of these after a tedious course of a year and three-quarters with serious deformity of the whole thorax." It will thus be seen that the operative treatment for purulent effusions is essentially different from that for sero-fibrinous, and the sooner after the diagnosis has been rendered positive by the aid of the hypodermic syringe, the purulent contents of the pleura are thoroughly evacuated, the greater certainty will there be of a favourable result. By reference to the "Guy's Hospital Reports" of 1877, with respect to the treatment of empyema, we learn from Dr. Goodhart's tabular analysis of 77 cases that fifteen were subjected to no operative treatment; of which two only, both children, aged five and two and a-half years, recovered; in eleven of the remainder the empyema pointed and discharged spontaneously, or was incised; of these, only two made good recoveries, the remainder under the radical method of treatment got well.

Drs. Barlow and Parker, in their notes on "Pleuritic Effusions in Childhood," observe with respect to spontaneous evacuation by external opening that "our experience does not supply us with a single good result." In my own practice, the single incision without drainage or washing has been successful in the case of a young patient aged five years, who is now living and in good health four years after the operation.

Of the few cases that have been operated upon among adults within the limits of my own knowledge and that of most of my medical acquaintances in Richmond County, or that have discharged spontaneously under their medical supervision, not one, so far as I can learn, made a permanent recovery. The great mortality resulting from the method by aspiration, and in fact from that by single incision as well, without antiseptic treatment, has undoubtedly been largely due, 1st, to the decomposing influence of infected air upon the purulent contents of the pleura; 2d, to failure in thoroughly evacuating these contents; and 3d, the non-use of strong carbolized spray (1 to 40) at the subsequent dressings, as well as during the operation. Powell, in his "Treatise on Consumption and Diseases of the Lungs," 1878, in referring to the operative treatment then recommended for empyema, observes, page 244: "As it is clear that we cannot empty the pleura even in recent cases without admitting air in place of fluid, we must adopt one of three methods: 1st, either to disinfect the air admitted into the pleura and having inserted a canula to close the wound with antiseptic dressings, to be renewed with the same precautions every three or

four days ; or 2d, to make a double opening and introduce a drainage-tube, so as to permit the escape of pus as rapidly as formed ; or 3d, to make a single incision or free opening, and insert a tube through which the pleura can be daily washed out with some disinfecting fluid." Of the three methods he says the first is to be preferred.

Dr. Gross in his "System of Surgery," in referring to the fact of the drainage-tube having lately been recommended, for the treatment of empyema, says, "it should not be encouraged, as it is both harsh and dangerous."

From the foregoing, it can readily be seen that a great diversity of opinions has, even within recent years, been entertained, as well as a variety of operative methods adopted, for emptying the contents of the pleura in the formidable complication of pleuritis we are now considering. The one great object sought has been to secure this result without the admission of air into the pleural cavity, or if this could not be avoided, then to so deprive it of its infecting qualities as to render it practically harmless. In fact, the fears of early operators, of the probable fatal effects of air reaching the cavity of the pleura, led them to perform the operation by single incision, for empyema, in a warm bath, that water rather than air should replace the pus evacuated. Setting aside the possibility of collapse, or paralysis of the heart, from this method, it is difficult to perceive what possible benefit could accrue from the substitution.

The following interesting case will show the results of two operations for the radical relief of empyema, the first being the introduction of the canula and application of the siphon, which failed, and the other by the anterior and posterior incisions and drainage-tube, as follows :—

Frank F., aged 20 years, came under my observation on the 4th of February last. His history developed the fact of his mother having died of "lung trouble," presumably "caseous pneumonia," also a sister of phthisis. Had been ailing for a week, supposed to be with a bad cold. Temperature taken at date of visit registered 106°; pulse 130; respirations 50. The physical signs indicated pleuro-pneumonia of the left side. The usual treatment was adopted, and, it being absolutely necessary to allay the intense pain, a hypodermic injection of morphia was administered.

Feb. 8th. Patient since last record has suffered severely with pain and dyspnoea when not fully under the influence of morphia. General appearance distressed. Pulse rapid and feeble. Temperature 104°. Respiration purely costal. Expectoration viscid, and of the brickdust variety. Physical signs presented dulness throughout the left side to mid-sternum. Heart's apex beneath the left border of the sternum. Tubular breathing heard in scapular and clavicular regions. There was clearly considerable effusion of some kind in the left pleural sac, but no diaphoresis had as yet led me to suspect the existence of pus. Very little change in the character of the symptoms occurred, if we may except a slight fall in the temperature and a gradual subsidence of the pain and dyspnoea up to the 12th of February, when the thermometer registered 102°, pulse 120, and respirations 46. At this date the dulness extended to near the lower border of the clavicle, the patient being restless and despondent.

On the 20th, I introduced a hypodermic needle into the pleura, and withdrew a portion of its contents, which proved to be of a sero-purulent character; but, to render the diagnosis a positive one, I took the fluid to my colleague, Dr. Wm. C. Walser, to verify it by a microscopical examination if it were correct, and through his kindness, demonstrated unequivocally the presence of pus globules, and the certainty of the case being one of empyema. The temperature at this date ranged from 100.5° in the morning to 102.5° in the evening. Pulse from 110 to 130. Respiration 46. Heart's apex beneath the sternum, and dulness extending to above the clavicle. Decubitus on the right side. Patient gradually emaciating, and his appetite failing, I resolved on the 27th Feb. to puncture the pleura, and accordingly, Dr. E. D. Coonley being present and assisting, I performed paracentesis, and applying the siphon, previously filled with water, and immersed at its lower extremity in the same liquid, withdrew about a pint of pus, when, it ceasing to flow, we were obliged to desist, and the canula was withdrawn, carbolized cotton being applied over the point of puncture. Very slight variations either of temperature, pulse, or respiration, occurred from this date to March 6th. There were moderate night-sweats, and well-marked hectic. The heart was now beating about two inches to the right of the sternum. Comparative measurements of right and left side showed an increase of two inches in favour of the left. Intercostal spaces obliterated, and a view of the patient anteriorly or posteriorly shows the whole of the left side of the thorax bulging. I now decided to perform one of the three radical operations suggested by Powell for the removal of the purulent contents of the pleura, and, it appearing to me that the one that would afford the fullest and freest exit to the contained matter gave promise of the best results, I decided upon the operation by anterior and posterior incisions and the drainage-tube, under a full stream of carbolized spray. Accordingly, on the 8th of March, 2 o'clock P. M., Drs. Wm. C. Walser and E. D. Coonley being present and assisting, and without the use of anæsthetics, save freezing the point of incision, I introduced a scalpel through the intercostal space between the fifth and sixth ribs, about two inches to the left of the nipple, and withdrawing it enlarged the opening with a probe-pointed bistoury to three-quarters of an inch, or sufficiently, at all events, to permit of the ready introduction of the drainage-tube. A full stream of pus being discharged with some force was, after a minute or two, checked by the fingers, and brandy freely administered to the patient, when the operation was resumed by introducing through the wound thus made a long and slightly curved sound, having a small knob on the end, which was carried downwards and backwards to as low a point in the pleura posteriorly as could be reached, and, so manipulating it that the knob of the sound could be distinctly felt in an intercostal space on the back, an incision was made to meet it. This being accomplished, and the opening enlarged as before, the end of the sound was passed through, and about half a yard of drainage tubing, previously rendered antiseptic, and provided with holes cut midway between each extremity, was slipped over the knob and withdrawn with the sound through the two incisions, and the two ends finally tied together outside. This completed the operation, and, after about five pints of pus had thus been withdrawn, the chest was carefully sponged with carbolized water, a sheet of carbolized cotton applied to the entire side, this covered with eight thicknesses of antiseptic gauze, and all held in place with antiseptic

gauze rollers, the patient clothed and replaced in bed, and stimulants administered *pro re nata*.

The relief afforded by the withdrawal of this large accumulation of pus, and the consequent removal of pressure upon the heart and right lung, was immediate and effective. The evening temperature after the operation registered 100°; pulse 96; respirations 36.

An opiate being administered the patient slept well. From this date to the 11th, when the dressings were renewed, the lowest record of temperature was 99°; pulse 92; respirations 36. On the morning of the 11th he complained of some pain, and had passed a rather restless night, his temperature then registering 101°. The application of fresh dressings under the carbolized spray again brought down the temperature to 98.5°. The dressings removed, as also the bedding, were thoroughly saturated with pus, of which a large quantity drained away during the operation of cleansing. The heart was now beating to the left of the sternum, but not in its normal position. Percussion note tympanitic anteriorly to eighth rib. Slight vesicular breathing heard in the supra-scapular region. Some cough, more particularly at night. Quinia, iron, and cod-liver oil are administered with stimulants, under the use of which the patient's appetite rapidly improves. On the 15th the dressings were again removed, and found as thoroughly saturated as on the last occasion. The same care was exercised in cleansing the wounds, tube, and the patient's body, and in their reapplication as before. The lowest record of temperature since the 11th has been 98° on the 13th; pulse 84; respirations 28.

The emaciation of the patient is now quite marked, and a small bed sore is discovered just above the articulation of the last lumbar vertebra with the sacrum, which is dressed with flexible collodion and tannate of glycerine. Appetite good, and sleeps well under an opium pill. The left wall of the thorax is now sunken, and the percussion note anteriorly less clear than before. Temperature before dressings are reapplied is 99°; pulse 92; respirations 30.

March 23. Temperature since last record has remained daily at 98.5°; pulse varying from 82 to 96, and respirations when at rest 26 to 36. Dressings renewed with comparatively slight drainage. A very painful abscess forming in right gluteal region; appetite, however, excellent. A constipated condition of the bowels complained of, which is relieved only by active cathartics.

28th. Dressings renewed. Very slight drainage. Abscess in thigh has discharged spontaneously, with but temporary relief to the pain and immobility of the right leg, as another and larger is forming two inches below. The question arises here, are these the result of local irritation from purulent matters in contact with an abraded surface, or the establishment of metastatic foci of inflammation from absorption of pus into the circulation under strong pressure upon the pleural walls?

We find that for some time back the emaciation of the patient has been gradually becoming more and more marked, until the bones of the pelvis and vertebræ now present an appearance of extreme prominence, which threatens grave possibilities in connection with the decubitus, which is now on the left side. Why, under these conditions, should abscesses have formed on the *right hip* rather than the *left*, assuming the local irritation to have been excentric? Before the final operation the decubitus was on

the right side, and consequently the local irritation also, and purulent absorption, if it occurred at all, must have occurred then; but up to that date, and some weeks later, there were no evidences of cellular infiltration in the right hip; some three weeks after the operation, however, when all the purulent contents of the pleura had been thoroughly evacuated, the decubitus being then on the *left* side, acute localized inflammation is set up in the cellular tissue of the *right* hip, and two abscesses follow one after the other. It would seem in this case that the local irritation was applied chiefly to the side opposite that affected.

Heart is now occupying a position to the left of the sternum, but somewhat above its natural position. Percussion note less tympanitic anteriorly, and weak vesicular breathing heard posteriorly to near the lower margin of scapula. General appearance improved. Sleeps now without anodyne or hypnotic. Temperature 98.5° ; pulse 86; respirations 26. *April 4.* Dressings renewed, no drainage. Tubing withdrawn and replaced by a horsehair seton eight strands, previously rendered antiseptic. Remaining abscess on thigh lanced, and a large quantity of pus evacuated, and cavity afterward carefully syringed with warm carbolyzed water. Bed-sore entirely healed. Patient is up and able to walk across his bed-room without assistance. Temperature, pulse, and respirations same as previous record. *12th.* Dressings reapplied, and found slightly soiled with discharge. Patient rode two or three miles with me yesterday, with great satisfaction. Eats heartily and sleeps soundly. No cough. Temperature, pulse, and respirations same as last record. Three strands of the seton removed. *19th.* Dressings reapplied, those removed slightly soiled with pus. Three more strands of the seton removed. Rode out with me again on Sunday, *17th*, with renewed health and strength; weighed yesterday, *18th*, and finds a loss of ten pounds on his weight taken just before his illness; his normal weight being 116 pounds, and his weight, as taken on the *18th*, being 106 pounds. Judging from his appearance, as presented at or soon after the last operation, and at the last dressing on the *26th* of April, there must have been a gain of at least ten or twelve pounds. His chest measurements, as taken on that date, are, circumference, $28\frac{1}{2}$ inches; from median line of sternum to spinous process of vertebra on the plane of the two nipples, left side $13\frac{1}{2}$ inches, right side 15 inches; from crest of ilium to tip of acromion process, left side $13\frac{1}{2}$ inches, right side 16 inches. The calibre of the left half of the thorax, it may thus be seen, is considerably reduced, the ribs approximating, and the shoulder drooping as in Pott's disease.

The remaining strands of the seton were now withdrawn, the discharge of pus being so slight as to suggest the probability of its being due entirely to the presence of the seton itself. The patient's general health is now good, and he daily indulges in out-door exercise, principally on foot, and has added two pounds to his weight since the last dressing a week ago. His temperature taken at this date registered 98.5° ; pulse 86; respirations 30. No visits were made from April 26 to May 4, the young man being out visiting, or engaged in some other equally agreeable occupation the greater part of the time. On the latter date the dressings were removed, and both the anterior and posterior wounds found entirely healed. The bandages not being reapplied, a porous buckskin under-shirt was ordered to be worn next the skin, and flannel over this. His weight

shows a net gain of four pounds since last dressing. Breathing sound distinct in both scapular and clavicular regions. Temperature 98.5° ; pulse 80; respirations 28. Returned to his business May 1.

The anatomical results consequent upon the gradual withdrawal of so large a quantity of purulent fluid from the cavity of the pleura naturally suggest the inquiry as to the cause of this retraction of the chest-walls, and the present relations of the two pleural surfaces in this case. We cannot attribute the former, as some authors have done, to atmospheric pressure, for we have had a perfect equilibrium of atmospheric pressure here since the operation. What, then, has led to the results as stated? The question can better be answered by entering into the consideration of the latter inquiry as to the present relations of the two pleural surfaces. The lung under the pressure of the large effusion into the pleura has been pushed back against the vertebral column, and adhesions have taken place, which, upon the withdrawal of this fluid, prevent its responding fully to the inspiratory effort. A large cavity remained, which nature at once set to work to fill, not with pus or serum, but with rapidly formed granulations upon both surfaces, which becoming aggregated and organized, until finally condensed into a firm living tissue, binds them permanently together, and constitutes the only retracting power that in this has diminished the calibre of the left side of the thorax in every direction, as shown by the measurements already given. We have now a condition present in which auscultation and percussion are practically of but little value in affording us information as to the breathing capacity of the but recently compressed lung. The general indications, however, lead us to the conclusion that a moderate expansion has already taken place, and that this is likely to prove a progressive one under the influence of a regular application of calisthenic rules for chest-development, that will eventually expand the left wall of the thorax at least one-half, and increase its measurements to a degree more nearly approximating the normal.

This case has demanded constant care, unceasing attention, and inexhaustible patience, but the result has freely repaid both the labour expended and the care bestowed in the satisfaction afforded by the knowledge of our having been instrumental in saving a human life that without such aid must inevitably have perished, and the sense of having done our entire duty.

ARTICLE VIII.

A STUDY OF PRIMARY, IMMEDIATE, OR DIRECT HEMORRHAGE INTO THE VENTRICLES OF THE BRAIN. By EDWARD SANDERS, M.D., late House Physician, Bellevue Hospital, New York; Attending Physician to Mt. Sinai Hospital Dispensary, Department of Internal Diseases.

INTRA-CRANIAL hemorrhages are of two general varieties: the extra-encephalic, or that in which the effusion of blood takes place within the cranial cavity but external to the brain,—the meningeal; and the encephalic proper, or that form in which the extravasation involves some portion of the encephalic mass. This latter variety may be further subdivided into the interstitial encephalic, or that in which the effusion takes place into some part of the brain substance; and the intra-ventricular encephalic, or that in which the blood is poured out into one or several of the ventricles of the brain. Generally speaking, this ventricular form is of two kinds: the primary, immediate or direct, occurring without previous laceration of the ventricular parietes; and the secondary, mediate or indirect, or that which follows laceration or influx of blood from some other point, the primary seat of the hemorrhage being external to these cavities. Specifically speaking, therefore, only such cases are to be considered as truly intra-ventricular in which the point of origin of the hemorrhage exists within the ventricles themselves, or is seated at some point in the superficies of their walls, and occur independent of any previous laceration of the brain substance or of the entry of blood from without. It is with this last form of intra-ventricular hemorrhage that I am about to deal. This subject, although not an original one, may still be considered to have a certain degree of newness or freshness about it in that its extended study has, as far as I have been able to determine after a very extended search through the medical literature at my command, not yet been undertaken. In its discussion I shall rely almost entirely on facts, remembering that “medicine needs more fact and less theory” (Hartshorne, *Essentials of Med.*, Phila., 1874, p. 21), theories and theorizing being avoided, except in a few instances, as far as a strict regard to clearness and completeness will permit.

Interstitial encephalic, or what is commonly, though inaccurately, known as cerebral hemorrhage, has long since taken its place among the recognized diseases of the cranial mass, while of late years the occurrence of the extra-encephalic or meningeal form has in its turn been firmly established.

The existence of immediate ventricular hemorrhage has been tacitly admitted as a fact, but seemingly none have attempted its verification. Occasional cases of it have been reported as such, generally as mere curiosities and without comment; but as far as I am able to determine, no

elaborate article has, in all the wide range of medical literature, been devoted to its separate and exclusive discussion. We all know and admit that intra-pleural, intra-pericardial, intra-peritoneal, tunica vaginal and meningeal, both cerebral and spinal, hemorrhages without involvement of the underlying organs or structures may, do, and have been positively proved to occur. While tacitly admitting that effusion into the ventricles of the brain may take place, how few have taken the trouble to verify it, granting that such was the case by receiving as a truth what they cared not or willed not to prove.

Up to within a comparatively few years meningeal hemorrhage seems to have been almost unknown, whereas of late years it has been erected into the dignity of a distinct and well-recognized disease, having its own etiology, pathology, and symptomatology, and no work on general medicine is now considered complete whose pages do not contain a description of it. The same may be said of hemorrhages directly into other serous sacs. Most of the recent elaborate treatises on medicine and surgery, such as Reynolds, Ziemssen, Erichsen, Holmes, etc., discuss these diseases as clinical entities which can be diagnosed and must be treated. As might be shown in a discussion of the anatomy of the ventricles of the brain, a more or less perfect analogy exists between them and the cavities we have just mentioned. Strange as it may seem, though important as the subject undoubtedly is, at least so I consider it, primary intra-ventricular hemorrhage is either passed by unnoticed, or if noticed, receives a passing mention only, being characterized as very rare, unimportant, and not to be diagnosed (Nothnagel, Hughlings Jackson, Brichteau, and many others). Here we have a series of intercommunicating cavities or spaces seated in the midst of the most important organ of the body; yet in spite of their great importance, their diseases are passed by almost in silence, and their hemorrhages, which I believe to be their most common disease, even more so than primary inflammatory conditions of their walls, are not deemed worthy of more than a passing, indefinite allusion. I am willing to assert that there has been no subject in the whole field of medicine which has received, of late years, more careful attention, more close observation; none which has been more worked upon and elaborated, than that of hemorrhage into the substance of the brain. Yet the fact that extravasation of blood into its ventricles, independent of laceration of its tissue, does take place, is, as a rule, as before stated, passed by in silence, or its occurrence is merely noted without comment. Like many other diseases that were formerly classified as very uncommon, but have by later research and observation been found more frequently present by merely being looked for, primary hemorrhage into the ventricles of the brain when sought for in the post-mortem room will, I am sure, share a like fate.

Among the earlier writers on medicine the ventricles of the brain seem

to have played a very important rôle in the explanation of the various diseased conditions of their cerebral pathology, more especially apoplexy. Thus, Avicenna was of the opinion that apoplexy arose from the interference with the passage of the sensitive or motor spirit (?) outwards from or inwards to the brain, depending on a sanguineous or phlegmatic (?) humour effused suddenly into the ventricles (liv. iii., feu. i. tract. 5). Bonet mentions instances of blood found in the ventricles in a fluid or coagulated form, and also refers to lesions or ruptures of the choroid plexuses. De Haen, Hufeland, Wepfer, Bartholin, and Fernel are among those who have blamed ruptures of the choroid plexuses as the immediate cause of extravasations of blood into the lateral ventricles. Lieutaud describes similar conditions, and gives a case of ventricular hemorrhage quoted from De Haen. Targione, as quoted by Morgagni, affirms that "in most who die of apoplexies, we see extravasations of blood in the ventricles." Morgagni himself would seem to believe, and with him many of the writers of his time, that cerebral hemorrhage or apoplexy was frequently due to rupture of one of the vessels of the choroid plexus, for we find him frequently blaming these processes as the source from which the blood was derived, the seat of the extravasation being placed in the lateral ventricles; in fact, to account for the presence of the blood in the ventricles in the cases he relates, the choroid plexus is almost uniformly blamed. Cheyne (*The English Malady; or A Treatise of Nervous Disorders of all Kinds*, Lond. 1733, p. 169) makes the following remark: "As to the immediate cause of the apoplectic fit, I think it must be one of these, viz., either a rupture of the bloodvessels in the brain, whereby a great quantity of blood being extravasated upon its including membranes, or into its cavities, presses upon the origin of the nerves, so as to intercept their operations and functions." We find Rochoux (*Recherches sur l'Apoplexie*, Paris, 1814, pp. 43 et 182) quoting two cases of ventricular hemorrhage, one of which he admits as primary while calling in question the probability of the other. This former case is recorded by Verattus, and is interesting in several respects as being one of the earliest carefully observed cases of this kind, and as being besides a pathological curiosity.

CASE 1. Exhalation of Blood into the Left Ventricle of the Brain, simulating Apoplexy.—A woman, aged fifty years, of a very healthy appearance, was suddenly seized with an attack of apoplexy, against which all remedies having proved useless, fever set in on the third day, and death occurred on the fifth. During the entire duration of the malady the respiration had been very shallow and slow, but still regular.

In opening the skull, the vessels of the cerebrum and cerebellum appeared distended by a large quantity of blood. The anterior portion of the left ventricle was filled throughout by blood in part fluid, in part coagulated. Otherwise there was nothing observable in the cavity itself; nor in the right ventricle; but much surprise was felt on finding in the centre of the clot of blood a small mass of curled and twisted hair, the hairs being intertwined and rolled up into a ball. It was as large as a pea, and although the hairs of which it was composed were very fine, they could be easily recognized as such both by the unaided eye and the microscope. By the latter no hair-bulb, which might have served as root, was discov-

erable; since they, for the most part at least, terminated at both ends in a point. They contained in their meshes some very small white corpuscles, of variable shape, of which Verattus, Beccarius, and some others who examined them did not know the nature. (Observation xlv., extracted from Verattus; Comm. de Bonen. Scienc. Acad. pag. 185 by Rochoux, Recherches sur l'Apoplexie, Paris, 1814, p. 182.)

Whether or no this was a case of hemorrhage into a dermoid cyst of the ventricle is, of course, impossible positively to decide, but the possibility of such an assumption is borne out by an undoubted case of true dermoid cyst in the left lateral ventricle of a boy ten weeks old, recorded by Prof. Rudolph Maier (Virchow's *Archiv*, bd. xx. S. 536); and another which Lebert (*Traité d'Anat. Path. Gén. et Spéc.*, Paris, 1861, tome ii. p. 80) quotes from Menghini, who found in the left lateral ventricle of a female, aged 50 years, a mass of implanted hair of the size of a pea, inclosing within it small pale bodies. Virchow quotes still another case.

Brieheteau (*Dict. de Sc. Méd., Journ. Comp.*, tome xli. 1818, p. 293), although admitting the occurrence of intra-ventricular effusion of blood, urges against making it a separate malady, and considers it very rare and merely a variety of arachnoid extravasation. The hemorrhage, according to him, "takes place by exhalation, the exhalation very probably having its seat in the arachnoid."

Copland (*The Causes, Nature, and Treat. of Palsy and Apop.*, Lond., 1850, p. 120; and *Dict. of Pract. Med.*, Lond., 1858, vol. i. p. 83), and Gintrac (*Gaz. Méd. de Paris*, 3d série, tome xxi., 1866, p. 799; and *Cours Théorique et Clinique de Path. Interne et de Thérapie Médicale*, tome vi., 1868), also concede the fact that the encephalic ventricles may have their own proper hemorrhages, and point out various sources from which the blood may be derived, but give no details; the latter, however, quoting numerous cases while apparently confounding the primary and secondary forms.

Le Gros Clark (*Brit. Med. Journ.*, vol. ii., 1868, p. 323) admits the existence of a ventricular hemorrhage, but maintains that there is no diagnostic sign characteristic of this special form of extravasation on which dependence can be placed, judging, as he states, by the records of such cases as are at his command. Bristowe (*Pract. of Med.*, Phila. 1876) states that hemorrhage into the ventricles is almost always secondary to extravasation into the brain substance, or to rupture of aneurisms at the base.

Bright (*Reports of Med. Cases*, vol. ii., 1831), Rilliet et Barthéz (*Traité de Mal. des Enfants*), Gendrin (*Traité Philosophique de Méd. Pract.*, tome iii., Paris, 1838, p. 444 et seq.), Rokitansky (*Path. Anat.*, Syd. Soc. Ed. 1850, vol. iii. p. 388), Tanner (*Pract. of Med.*, Phila. 1870, p. 353), Hughlings Jackson (*A System of Med.*, by J. Russell Reynolds, vol. ii., 2d ed., 1872, p. 522), Grasset (*Mal. du Syst. Nerv.*, Paris, 1879, tome i. p. 580), Key and Retzius (*Studien in der Anatomie des Nerven Systems*

und des Binde gewebes, Erste Hälfte, Stockholm, 1875), Hammond (A Treat. on the Dis. of the Nerv. Syst., 6th ed., N. Y. 1876, p. 86), Roberts (Pract. of Med., Phila. 1876, p. 833), Ed. Long Fox (The Path. Anat. of the Nervous Centres, Lond. 1874), and Nothnagel (Cyclop. by Ziemssen, vol. xii., N. Y. 1877, p. 89), all concur in the belief that this form of hemorrhage sometimes takes place, but also agree in declaring it very infrequent. Dr. Aitken (Pract. of Med., vol. ii., Phila. 1866, p. 349) remarks that "hemorrhage may arise from the lining membrane of the ventricles, which bleeds so profusely as not only to fill the lateral ventricles, but even to enlarge their cavities. As death in these severe cases is usually sudden, the walls of the ventricles are generally healthy, but in some very few instances the septum lucidum has been found ruptured, and the ventricles have freely communicated. The smaller ventricles are in a very few instances also the seat of apoplectic effusion." Duret (*loc. cit.* p. 42) states that in his experiments he has met with clots of blood or fluid filling the ventricular cavities. Thus he says, "we saw one small clot, which closed the aqueduct of Sylvius, and another at the opening of the central canal. Such clots are the result of ruptures of the arteries or the veins of the choroid plexus, as we have several times shown, or they arise from small hemorrhagic foci in the floor of the fourth ventricle."

Primary intra-ventricular hemorrhage may, therefore, the weight of testimony being preponderatingly in this direction, and as shown by the many cases I have been able to collect, be considered as established, and its various modifying conditions and circumstances now remain to be shown.

Frequency and Seat.—Intra-ventricular hemorrhage, as before stated, is naturally divisible into that which is primary, immediate or direct; and that which is secondary, mediate or indirect. For comparative purposes we will first glance at the frequency of occurrence of secondary cases, or those consecutive to extravasation at some other point in the cranial cavity than the ventricles.

According to Hammond (*loc. cit.* p. 89), this accident occurs in about one-half of all cases of cerebral hemorrhage, but this estimate is far too high, as shown by the following figures:—

	Total cases.	Rupturing into ventricles.
Andral	10	1
Gintrac	560	46
Rochoux	19	8
Durand-Fardel	139	66
	<hr/> 728	<hr/> 121

or about one case in every six. Now hemorrhage being more frequent in the right than in the left half of the brain, it is to be presumed, although I have not been able to find any statistics bearing upon this subject, that secondary ventricular extravasation occurs more often on the right than on the left side, especially when we remember that the right corpus stri-

atum and optic thalamus are with greater frequency the seat of hemorrhage than the left—73 right, 63 left (Gintrac, *loc. cit.*); and that it is from these points that secondary ventricular effusion generally occurs. As regards the relative frequency in the various ventricles, I can only state that the preponderance is greatly in favour of the lateral. The following figures from Durand-Fardel (*Traité Clin. et Prat. des Mal. des Vieillards*, Paris, 1854) may throw some light on this subject. They have reference to the situations in which the blood was found on *post-mortem* examination and not to the seat of the laceration by which the blood gained entrance into the ventricles:—

	Times.
In all four ventricles	20
In the two lateral ventricles only	23
In one of the lateral ventricles	16
In the third and fourth ventricles	1
In the middle ventricle only	1
In the fourth ventricle only	4
In the fourth and a lateral ventricle	1
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	66

Thus we find blood in one or the other of the lateral ventricles 60 times, in the fourth 26 times, and in the third 22 times. The fact that blood was found more commonly in the fourth than the third ventricle may be accounted for by reason of the frequent entrance of extravasated blood from the base through the foramina as will be shown later on.

Now, as regards the frequency of occurrence of immediate intra-ventricular hemorrhage itself, Brichteau (*loc. cit.* p. 293) says: "It is rare to see an apoplectic extravasation take place primarily into the ventricles of the brain. During ten years' observation in different hospitals, I have met with this condition but twice. Almost always when blood is found extravasated into the cavities, it has passed into them by means of a laceration establishing a communication between them and the primitive *foyer* in the cerebral substance. In the two cases referred to, not the slightest trace of laceration of the ventricular walls was observed." Rochoux (*loc. cit.* p. 196) gives two cases of primary hemorrhage into the lateral ventricles, but as he himself is doubtful about one of them, that of Wepfer, deeming it to be probably of the secondary form, we find but one case among the forty-one of cerebral hemorrhage which he quotes. Rokitsansky (*loc. cit.* p. 388) speaking of this condition says: "Hemorrhage into the lateral—not the rupture into the ventricles, which so frequently happens to apoplectic cavities in the corpus striatum and optic thalamus, but hemorrhage from the lining membrane and vessels ramifying near it—is an extremely rare occurrence. I once met with it, as others also have done, in a very large congenital hydrocephalus." Hughlings Jackson (*loc. cit.* p. 522) remarks: "We occasionally find blood in the lateral ventricles. In the vast majority of cases it comes from a rent in the

corpus striatum or thalamus opticus. . . . I have, however, twice known blood effused into the ventricle without injury of the ganglia in its floor." Gintrac has also personally met with but two cases.

From the foregoing quotations we notice that primary intra-ventricular hemorrhage is considered to be very rare, and that reference seems only to be made to that form taking place into the lateral ventricles, the others apparently being lost sight of. Therefore we must necessarily be led to suppose that the other ventricles are in their turn but very seldom the seat of extravasation, even when compared with the lateral ventricles. Aitken (*loc. cit.* p. 349) says: "that in a very few instances the smaller ventricles are also the seat of apoplectic effusion," and quotes a case from Abercrombie. Gendrin (*loc. cit.* p. 447) also admits that extravasation may take place primarily into the third or fourth ventricle without the lateral ventricles containing any blood, but is unable to add any new case, stating that he knows of but a single example of this variety of hemorrhage, this being the one already referred to by Aitken. We may thus judge of the supposed great rarity of this form of the affection; and it must be added that almost all authors who have mentioned this subject agree in considering primary intra-ventricular hemorrhage an extremely rare disease.

The fact that it is believed to be of such great infrequency is partially due to its being overlooked, or not being sought for, and even when found either misunderstood or mistaken for the ordinary variety of cerebral hemorrhage. Thus many of the cases which I have collected, although in most of them there was not the slightest degree of laceration of the ventricular walls, had been reported as ordinary cases of extravasation, and had, therefore, attracted little or no attention. Again, it is probable that many cases where laceration is present, the laceration usually being confined to the non-ganglionic portions of the parietes, and even some where it affected the superficial parts of the ganglia, especially the corpora striata, as in cases by Wilks and Bright, are cases of the variety of cerebral hemorrhage under discussion; the laceration being secondary—not the cause but actually the effect of the pouring out of blood into the ventricular space. In this opinion I am upheld by a number of authorities. Thus in Hutchinson's case, a doubtful one, there existed at many spots of the brain substance of the interior of the cavities lacerations and ecchymoses, "probably due to the effects of pressure and displacement." In Blache's case a similar condition existed. Aitken, Gintrac, and others refer to lacerations of the septum lucidum, following intra-ventricular hemorrhage. Other instances are by Kilgour and Chomel. In my own case there was some tearing and infiltration of the brain substance immediately surrounding the descending cornu on the right side, which was without doubt secondary to the effusion into the corresponding lateral ventricle. But why multiply details when the fact that laceration must occur under the conditions which we are discussing is, as it were, "a self-evident truth"?

—for, given a rapidly increasing, distending effusion into a cavity with lacerable parietes, one of two things must follow: either the fluid will find its way outwards through a natural opening, or it will make one for its escape if none previously exists, or if this be insufficient.

Another condition which caused true ventricular hemorrhage to be overlooked or mistaken for something else, is the escape of blood from within outwards, either, first, by passing through the aperture or foramina connecting the fourth ventricle with the arachnoid cavity; second, by following the course of the choroid plexus and pia mater, and making its exit through the transverse fissure; third, by lacerating the brain tissue, either passing down the cornua, especially the descending, and forcing a passage to the base through the nervous substance, by tearing away the valve of Vieussens, or perhaps by rupturing the floor of the third ventricle and thus reaching the base; or lastly, by tearing through the corpus callosum. The possibility of the first condition can hardly be placed in doubt when we remember the numerous facts, both pathological and experimental, that go to establish it. Hughlings Jackson and Magendie concede it. Key and Retzius have demonstrated it by actual experiment, and pathology proves it; in fact, the latter authors have seen it occur in the case of primary ventricular hemorrhage they have reported.

According to Gendrin (*loc. cit.* p. 444), the blood having taken its origin from the choroid plexus and filling the lateral ventricles may pass from within outwards by following the course taken by the plexus on its way to join the pia mater, and may thus give rise to a seeming meningeal hemorrhage. The truth of the third condition is borne out by the following cases: In a very complicated case reported by Dr. John Scott (*Edin. Med. and Surg. Jour.*, vol. xlii. 1834, p. 245), the blood had passed down the middle cornu on the right side and forced a way through the brain substance to the base. Dr. Todd (*loc. cit.* p. 641) maintains that blood escapes as often, if not more frequently, at the inferior cornua of the lateral ventricles as at the foramina of the fourth ventricle. This, however, is not borne out by facts. In Hutchinson's patient a clot, the size of a hazelnut, lay under the arachnoid close to the upper part of the restiform body, having escaped by lacerating the valve of Vieussens. In Forbes's case the blood had escaped below the cerebellum probably, also, by tearing away the valve, but this is not stated in the history of the case. According to Gouguenheim (*Des Tumeurs Anévrysmales des Artères du Cerveau*, Paris, 1866, p. 51), the blood being extravasated at the base of the brain sometimes by the force of the hemorrhage ruptures the floor of the third ventricle and thus enters this cavity. Such being the case we can easily understand how it might make its exit in an opposite direction, the hemorrhage having its seat in the ventricle itself. The fact that blood may escape from the ventricular space by lacerating the corpus callosum, and passing out at the great longitudinal fissure can, with justice,

be supposed, by remembering the oft-quoted case of chronic hydrocephalus, that of Cardinal, originally reported by Bright, where a similar accident occurred, the serum within the ventricles forcing its way externally by the route designated. Besides, Gintrac quotes a case in which blood secondarily extravasated into the lateral ventricles followed a like course.

It will be noticed that the blood chooses those points for forcing its way outwards where the ventricular cavity approaches the surface of the brain, the situations, therefore, which offer the least resistance. Such cases as come under the foregoing heads have been, and in the future probably will be, mistaken for cases of meningeal hemorrhage; in fact, so closely do they resemble the true that they might almost be said to be instances of apparent or pseudo-meningeal hemorrhage. Conversely, it is also true that the extravasation being primarily meningeal, following an inverse direction, may make its way into the ventricular cavities, as occurred in cases reported by Lidell, Abercrombie, Hare, Bristowe, and others, this taking place most frequently with rupture of aneurisms at the base, usually through the foramina of the fourth ventricle. Key and Retzius (*loc. cit.* p. 123) state "that a bloody admixture, even actual clots may be found in the ventricles without the slightest hemorrhage having occurred in them, the blood having reached them from a quite distant point." Nothnagel (*loc. cit.* p. 174) writes: "It is not uncommon for the blood, if extravasated in large quantities, to make its way into the ventricles;" while Niemeyer (*A Text-Book of Prac. Med.*, trans. by Humphreys and Hackley, N. Y. 1874, vol. ii. p. 203) says that "usually part of the extravasation (arachnoid) reaches the ventricles, and there also we find more or less blood."

In some cases blood may be simultaneously poured out both upon the internal and external surfaces of the brain. In a case recorded by Wepfer (*Historia Apoplecticorum*, Obs. I.) quoted in full by Rochoux (*loc. cit.* p. 43) and referred to by Gendrin (*loc. cit.* p. 444) this condition existed to a marked degree. The same was present in a case reported by Dr. John Scott, and seems to have occurred in several of my collected cases. We can easily understand the difficulty, even the almost impossibility of determining under these circumstances the part of the encephalon from which the hemorrhage primarily arose, whether at one or several points, the difficulty usually met with in finding the vessel from which the blood in cerebral hemorrhage came being remembered.

After carefully searching the various works at my command, I have been able to collect a series of ninety-four cases of the disease under discussion, some having been reported as such, but many as ordinary cases of cerebral hemorrhage. I have excluded from the list all about which there was a decided doubt, even though reported as cases of primary ventricular extravasation.

The only figures bearing upon the absolute frequency of this condition

as compared with cerebral hemorrhage, are those of Rochoux already quoted, *i. e.*, two cases in forty-one of hemorrhage into the brain, one of which has justly been considered very doubtful. It must be confessed that such figures are of but little practical value, as the number is far too small for the determination of such a question.

The relative frequency of the disease is shown by the following table:—

Left lateral ventricle	22
Right lateral ventricle	18
Both lateral ventricles	1
Lateral ventricles (which, undetermined)	28
Third ventricle	6
Fourth ventricle	4
Third or fourth ventricle (which, undetermined)	1
Not determinable	14
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Total	94

In only 59 of these cases was the ventricle into which the hemorrhage occurred indicated by the reporter, but in the others I have from various modifying circumstances been able to determine with a certain degree of accuracy that it primarily took place into one or the other ventricle in all but 14 cases. Of course it must be admitted that such a table is justly open to doubt and can only be considered as problematic, and is therefore far from decisive. The 59 cases mentioned were arranged as follows:—

Left lateral ventricle	20
Right lateral ventricle	14
Both lateral ventricles	1
Lateral ventricles (which, not noted)	21
Third ventricle	3
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Total	59

Thus in 94 cases of primary intra-ventricular hemorrhage, we find 69 occurring into one or the other of the lateral ventricles, and in 40 of these in which this point was determinable, it took place 22 times into the left and 18 into the right ventricle, thus differing from the secondary form where the contrary was presumed to hold true. Eleven cases involved either the third or fourth ventricle, showing that this variety is not as infrequent as one would suppose. Of these six primarily affected the third, four the fourth, while one was doubtful. Among the 59 cases above mentioned about the same relations existed.

There is no case of primary hemorrhagic effusion into the fifth ventricle on record, the absence of extravasation here being explained by the absence of a vascular lining membrane, while its small size and the tenuity of its walls render the determination of such a hemorrhage, if it exist, extremely difficult. Gintrac relates a case in which this ventricle was found full of blood following laceration of the septum. This case, however, was a secondary one.

Simultaneous hemorrhage into both lateral ventricles may occur according to Gendrin (*loc. cit.*), but he was unable at the time he wrote to find any

such case recorded. Nor am I able to establish positively such an instance. Of my collected cases blood is only noted in 14 instances, as being found in both lateral ventricles. However, it is but fair to state that in only one of these is the condition of the other ventricles accurately given.

Whether or no hemorrhage can occur at the same time into any other two or more ventricles, for instance, one lateral and the third, or one lateral and the fourth, or the third and fourth, cannot be determined, but I am inclined to think not, at least none of the cases collected are available in the determination of this question.

Etiology.—The causes of primary intra-ventricular hemorrhage, both immediate and remote, excepting a few variations, differ in no essential respect from those of ordinary encephalic extravasation, and like them may more conveniently be considered and best understood under the two general heads of those which are predisposing and those which are exciting. Among the former may be classed age, sex, habits of life, seasons, etc.; among the latter sudden or prolonged exertion, emotional disturbances and injuries.

Age.—It is here that the greatest difference prevails between the variety of hemorrhage under discussion and the ordinary form, as the following table will show:—

VENTRICULAR HEMORRHAGE.			CEREBRAL HEMORRHAGE.		
	Cases.	Per cent.		Cases.	Per cent.
Under 1 year of age	7	10.00			
1-10 years	3	4.29			
11-20 "	4	5.72	Under 20 years of age	1	0.26
21-30 "	6	8.56	20-30 years	10	2.61
31-40 "	7	10.00	30-40 "	20	5.22
41-50 "	12	17.14			
51-60 "	13	18.57	40-60 "	311	81.20
61-70 "	13	18.57	60-70 "	33	8.62
71-80 "	5	7.15	70-80 "	5	1.31
			Over 80 "	3	0.78
Total	70		Total	383 ¹	

Of course our own cases are far too few in number for any positive statements, but few as they are this remarkable fact must be noticed; the comparatively frequent occurrence of intra-ventricular hemorrhage at the two extremes of life, in the very young and the very old, 14 cases, or 20 per cent., at or under the age of 20 years, and 5 cases, or 7.15 per cent., after 70 years; as compared with .26 per cent. and 2 per cent. relatively of the common form.

Gerhardt (*Kinderkrankheiten*) affirms that proportionately hemorrhage in children occurs very frequently into the ventricles of the brain; while Alois Bednar (*Die Krank. der Neugeborenen und Säuglinge*, Wien, 1850,

¹ Hammond, loc. cit., p. 78.

p. 36), on the contrary, remarks that a hemorrhage into the ventricles is less frequently observed than the other forms of cerebral extravasation. According to Meigs and Pepper, ventricular hemorrhage is more common after three years of age than before. Cruveilhier (*Bul. de la Soc. Anat. de Paris*, tome vii., 2me ed., 1846) distinguishes three varieties of apoplexy in the new-born: the meningeal, the ventricular, and that into the brain substance; the first and second according to him being frequent, the third rare. In all, 14 cases were in patients under the age of 20 years. Three were aborted fœtuses, two of $5\frac{1}{2}$ months, and one of $6\frac{1}{2}$ months; a fourth a new-born child; another a baby 2 days old; a sixth a child of 6 months; another a child of 20 months; an eighth a patient 3 years of age; a ninth a purpuric boy of $3\frac{1}{2}$ years; a tenth a boy of 4 years; an eleventh a boy of 11 years; a twelfth a lad of 13 years; a thirteenth a youth of 14 years; and a fourteenth an adult of about 20 years. Thus we have 8 of these 14 cases at or before the third year of life. The youngest case of cerebral hemorrhage coming under the notice of Hammond, was in a lad of 17 years of age. Five of my cases occurred in patients who had passed the 70th year of life, the oldest being a woman of 80. MacLachlan (*Dis. and Infirm. of Advanced Life*, Lond. 1863, p. 164) writes that "there are two forms of hemorrhage within the skull almost peculiar to the aged. In the first the blood is poured into the ventricles of the brain; in the second, into the great cavity of the arachnoid (intra-arachnoid apoplexy), or beneath this membrane in the space between it and the pia mater (subarachnoid apoplexy)." In this matter of age, as might be expected from the anatomical resemblances of the two parts, we find an exact correspondence between primary ventricular and meningeal hemorrhage. "True meningeal hemorrhage," says Ramskill (*System of Med.*, Reynolds, vol. ii., 1872, p. 418), "is an affection which is found generally at the two extremes of life, in infancy and old age."

Over one-third of my cases, where the period of life was recorded, was in patients below the age of 40 years, 35.57 per cent.; whereas but 8 per cent. of the ordinary form occurred during a like period of life. The age of maximum frequency corresponds pretty closely to that of the interstitial variety of encephalic hemorrhage, *i. e.*, between 40 and 70 years.

Arranging the cases into classes of twenty years each, in order to show the relative frequency during the four quarters of life, we get the following:—

	No. of cases.	Per cent.		No. of cases.	Per cent.
VENTRICULAR HEMORRHAGE.			CEREBRAL HEMORRHAGE.		
1st quarter	14	20.00	1st quarter	1	0.26
2d "	13	18.57	2d "	30	7.90
3d "	25	35.71	3d "	311	81.84
4th "	18	25.71	4th "	38	10.00

The cases of ventricular hemorrhage seem more uniformly spread over the various periods of life than in cerebral hemorrhage proper. Other points of resemblance and difference may be noted by glancing at the tables, but they are hardly of sufficient importance to deserve separate mention.

We must add that in eighteen cases in which the age, though indicated, was not distinctly stated, one occurred in a congenitally hydrocephalic infant, two in "old men," and fifteen in adults. The age was not indicated in six cases only.

Sex.—Here we find an almost exact correspondence between the two forms of encephalic hemorrhage we are now comparing. Thus in Hammond's 383 cases there were 259 or 67.62 per cent. males, and 124 or 32.38 per cent. females. Of my own 94 cases the sex is noted in 83; of these 59 or 71.08 per cent. were males, and 24 or 28.92 per cent. females. These cases were distributed over the various ages as follows:—

Age.						Male.	Female.
Less than 1 year	.	.	.	.	.	2	1
1 to 10 years	.	.	.	.	.	3	—
11 to 20 "	.	.	.	.	.	3	1
21 to 30 "	.	.	.	.	.	4	2
31 to 40 "	.	.	.	.	.	2	5
41 to 50 "	.	.	.	.	.	8	4
51 to 60 "	.	.	.	.	.	9	4
61 to 70 "	.	.	.	.	.	10	3
71 to 80 "	.	.	.	.	.	3	2

It will be noticed that in the decade 31 to 40 years only the females predominated.

Seasons.—Judging from the few facts bearing on this subject, winter would seem to be the season, and December the month of greatest prevalence of this disease; but as the number of cases in which this point can be determined is far too small for anything like positive deductions, the following are advanced with reserve:—

March, 2 cases,	} Spring 1 total 11 cases.	June, 1 case,	} Summer total 8 cases.
April, 4 "		July, 3 "	
May, 4 "		Aug., 4 "	
Sept., 2 cases,	} Autumn total 10 cases.	Dec., 7 cases,	} Winter 1 total 16 cases.
Oct., 3 "		Jan., 4 "	
Nov., 5 "		Feb., 4 "	

In three cases pregnancy existed, and in all delivery or an attempt at delivery occurred; one patient having passed the middle period of gestation, and two being in the ninth month; but in none did post-partum accidents occur. In two patients the attack came on just following delivery, both probably being cases of puerperal eclampsia.

The heart is mentioned as enlarged in thirteen cases, in only five of which did left hypertrophy exist to any considerable degree. In ten cases a previous attack of hemorrhage or hemiplegia is mentioned, a rather

large proportion. Of these, in one case the fatal seizure was the third, in another it is noted that the patient had already had several, and in one instance the previous attack had been into the left lateral ventricle, as shown by the post-mortem examination. In six cases convulsions preceded the attack for a greater or less period of time; in one, a woman, it is stated that she had suffered from "fits," not strongly marked by convulsion, since early childhood; in another, a male, epileptiform convulsions had occurred at long intervals for a number of years; in a third, the convulsions immediately preceded the attack; in a fourth, the patient had, it is stated, "two or three attacks of epilepsy," and in two females the convulsions were eclamptic, following labour, the urine being albuminous in one of these.

One case was a patient suffering from leucocythemia.

CASE 2. L. F., aged 13. In addition to the ordinary appearances of the blood, and symptoms of leukæmia, he presented considerable enlargement of the liver and spleen. At the same time there existed several large ecchymoses over the malleoli, and numerous purpuric spots over the upper portions of the chest. On several occasions he suffered from epistaxis and subconjunctival ecchymoses, and for some time his urine was albuminous. On 23d Nov. the little patient complained of giddiness and pain in his head; sight unimpaired; there was frequent cough, with abundant râles; fever. On 4th Dec. having kept his bed for several days, left it; his pulse was small, and there was slight deafness. On 5th, at 3 o'clock, abundant bilious vomiting and profound coma; at 7 o'clock more vomiting; at 8 o'clock coma persistent, insensibility, and resolution of the extremities, tracheal râles, pulse strong and better than at any previous time, 96; respiration 36 per minute. Death at 10 A.M.

Autopsy.—Cranial and spinal cavities; no extravasation of blood in the cerebral arachnoid; the subarachnoid spaces filled by a cloudy, reddish serum, resembling the serum of the blood obtained before death by venesection; the pia mater infiltrated with serum of the same appearance; nothing observable on the inferior surface of the brain; the cerebral lobes present a slight opaline tinge.

Ventricles.—The two lateral ventricles each contain an elongated clot, which curls around without penetrating into the choroid plexuses, which are pale but intact. The clots are soft and diffident, like those obtained after venesection, wine-coloured, soon becoming of a bright red tint on exposure to the air. The cavity of the ventricles filled with serum. The clots are prolonged forwards into the middle ventricle through the very much dilated foramen of Munro. Behind they descend into and fill the posterior cornua to the hippocampus minor. In the middle cornua, along the cornu Ammonis, there was found a turbid serum, but no clots. The left lateral ventricle presents in addition a small capillary apoplexy of the white substance outside the corpus striatum. In the middle ventricle the clot was situated beneath the tela choroidea, and was continued into the aqueduct of Sylvius. In its left lateral wall a small superficial apoplexy, of the size of a lentil, was found. The right lateral wall was much more disorganized, the extravasation having destroyed its inferior part, without, however, penetrating more than three or four mm. into the thalamus.

The aqueduct of Sylvius was occupied by an elongated, cylindrical clot, which was continuous with a clot in the fourth ventricle, completely filling it. The latter occupied the posterior median fissure.

The walls of the fourth ventricle, the cerebellum, and the cord were healthy; the same being true of the pons and remaining parts of the encephalon. The spinal canal and cord presented no alteration from the occipital foramen down to the third dorsal vertebra, but from this point to the sacrum there was meningeal hemorrhage, clots being found between the dura mater and the bone. No extravasation in the subarachnoid space, no appreciable lesion of the cord. (M. Blache, *Bul. de l'Acad. de Méd.*, tome xxi. 1856.)

Another occurred in a case of scurvy.

CASE 3. An in-pensioner of Chelsea Hospital, aged 70, in whom a dry coagulum, fawn-coloured externally and black internally, somewhat larger than a garden pea, was found attached to the plexus choroideus, death in ten or twelve hours after the accession of stupor. The man had previously been much reduced by scurvy, in which, no doubt, the limited effusion had originated, otherwise, from the appearance of the coagulum, he would very probably have recovered. (D. Machlachlan, *loc. cit.* p. 166.)

A third patient was the victim of purpura.

CASE 4. A boy, aged $3\frac{1}{2}$, was noticed to be languid for one day. On the second day bruises were observed on different parts of the body; on the third day, at 8 A. M., convulsions came on. The patient was in a torpid state, pupils equally contracted, tonic spasms over the whole body. Death occurred three hours after the convulsive seizure, and was followed by great rigidity.

On the *post-mortem* examination twenty-five hours after death, purpuric spots and bruises were well marked. The dura mater was adherent, and there was extensive hemorrhage into both ventricles, with laceration of the brain substance. There was no fracture of the skull. The child was well fed, and lived in good air. The case appeared one of idiopathic purpura. The blood probably exuded in this case from the choroid plexus, as no ruptured vessel could be found. None of the family was known to be bleeders. (Hallowes, *Brit. Med. Jour.*, vol. ii. 1878, p. 733.)

One case was affected with aggravated malarial cachexia, and a fifth was in a patient whose system was greatly reduced, having a few days before the fatal attack suffered from rather profuse hemorrhage from the gums.

Whether or no prolonged or sudden exertion is to be considered as a factor in the production of ventricular hemorrhage, cannot be positively determined, although it is mentioned as having preceded the seizure in Williams's, Bright's, and one of Mayo's cases. One patient was found insensible in a water-closet; here the possibility of straining at stool presents itself; and in one instance the attack occurred during coitus at the moment of ejaculation. In several cases the attack followed some slight exertion, but hardly such as might reasonably be considered capable of causing it.

A direct connection may, however, be traced between emotional disturbance and the disease in question, as in the following cases:—

CASE 5. A man, aged 67, porter, while occupied in sweeping the stairs of his house, became involved in a quarrel with a servant, and in the midst of violent anger, fell motionless on the stairs, without, however, losing consciousness. He was carried to the Hôtel Dieu. His entire left side was completely paralyzed; intelligence still unaffected, but for a time very obtuse; speech altered; there was slight acceleration of the pulse, and a little febrile movement. The next day he presented in the sound extremities slight contracture, and some convulsive movements. There was neither paralysis of the rectum nor of the bladder. The patient died on the third day, having presented alternating convulsions and resolution of the extremities.

On *autopsy*, extravasation of a rather large quantity of blood was found in the ventricles, with slight laceration of the posterior parietes of the left ventricle. (Chomel, *Journ. des Connais. Méd. Chirg.*, 1847, p. 135; and *Gaz. Méd. de Paris*, 3me série, tome i., 1846, p. 992.)

CASE 6. Male, aged 46, violent quarrel; cephalalgia, state of excitation; stertor, loss of consciousness; nevertheless when irritated withdrew the extremity; teeth clenched; inability to swallow. Death at the end of 24 hours.

Rupture of the vein of the right choroid plexus. (E. Gintrac, Cours Théorique et Clinique de Path. Interne et de Thérapie Méd., tome vi., 1868; from Serres, *Annuaire Méd. Chirurg. des Hôpit.*, Paris, 1819, p. 320.)

CASE 7. Woman, eighty years of age, plethoric, in Dec., while at table, became angry and fell; deprived of sensation and motion; stertor; eyes fixed; hands cold; resolution. Death on the eighteenth day.

Cerebral arteries full of blood. Large blood clot in the ventricles. Vessels of the choroid plexus ruptured near their junction with the tela choroidea. (*Ibid.*, from Drelinecourt, Bonet's Sepulchretum, tome i. p. 87.)

In one case the hemorrhage seems to have been secondary to ventricular inflammation.

CASE 8. A boy, four years old, healthy, fell, eighteen months back, three feet, striking his head on a hard board, wounding himself in the nape of the neck. He lost much blood. He soon recovered, but his good temper and docility changed into stubbornness bordering on viciousness. His right eyelids were always swollen, and the eye itself appeared more sunken in the head and smaller than the left. His gait was unsteady and stumbling; appetite, digestion, and other functions undergoing no change. In the winter he was attacked with croup. In twelve hours the symptoms of croup suddenly disappeared; and soon after symptoms of inflammation of the brain declared themselves, and the patient died the next day, presenting the indications of water stroke (serous apoplexy).

Autopsy.—This reveals traces of violent turgescence and inflammation of the cranial contents. Lymph was found in considerable quantity at the base, but little over the corpus callosum, in the ventricles, and in other situations. No serum in the cavities of the brain, but in the right ventricle blood was found extravasated, and an unorganized, oviform mass of the size of a pigeon's egg, weighing two ounces, and appearing to consist of coagulated lymph covered over with blood. The latter had probably its origin in the fall, and was the cause of his change in character; and the former produced the symptoms of water-stroke. (Goelis, *Hydrocephalus Acutus*, trans. by Gooch, Lond. 1821, p. 249.)

Such a case is to be compared with the instances of hemorrhagic effusion sometimes occurring during acute pleurisy, pericarditis, peritonitis, etc., and perhaps also with the so-called cases of pachymeningitis hemorrhagica interna. Besides, we also find bloody admixtures of the effused fluid in cases of acute hydrocephalus, leptomeningitis infantum, etc. (Huguenin); while Rokitansky, Förster, and others refer to ventricular hemorrhages occurring during the course of a congenital hydrocephalus.

According to Hewett (Holmes's Syst. of Surgery, vol. iv., p. 156) the ventricles of the brain are occasionally found filled with blood after injuries of the head, and speaking of contusion of the brain, he remarks, "in connection with this subject it may be stated that a laceration of the floor of the lateral ventricle, even when very slight, may give rise to an extensive extravasation of blood into this cavity, should it so happen that the injury corresponds to the situation of one of the large veins in this region. In a preparation in the museum of St. George's Hospital there is a slight laceration of the septum lucidum, as well as of the floor of the left lateral ventricle, where a large vein was laid open, and the ventricle was full of blood." Duret in his experiments has several times seen clots of blood in the ventricles of dogs, following sharp powerful blows upon the head. Of course it might be justly urged against such cases that they do not rightfully come under the head of primary ventricular hemorrhage as defined,

but as in such cases the laceration will be so minute as to be passed by as a rule unnoticed, and as we can hardly imagine such a tear giving rise to symptoms of its own, it is deemed best to include and consider such cases as instances of immediate intra-ventricular extravasation, admitting that strictly speaking they are in reality not so. In Hutchinson's case reference is made to a supposed injury to the head, but as the history is indefinite on this point, nothing positive can be deduced therefrom. In a case reported by Wilks (Lects. on Dis. of the Nervous System, Lond. 1878, p. 85), traumatism undoubtedly was the cause of the ventricular hemorrhage. "In a man who had fallen and cut his head, the ventricles were found full of blood, but a most careful examination failed to discover the source of the hemorrhage."

Gout, abuse of alcohol, syphilis, etc., may be mentioned as predisposing causes, acting in the same manner as in ordinary cerebral hemorrhage, that is, by giving rise to changes in the arterial walls of the cerebral vessels.

Pathology.—Can hemorrhages into the ventricles occur without rupture of the bloodvessels? Can the extravasation of blood take place by the process formerly known as exhalation, but now known as diapedesis, hemorrhage by transudation through the vascular walls? I am willing to admit, though doubtingly, that such might be true of those cases where the hemorrhage remains minute; such, for instance, as are found in leptomeningitis infantum, or cases of serous ventricular effusion with bloody admixture; but I am hardly prepared to admit the truth of this proposition when dealing with large hemorrhages. Brichteau (*loc. cit.*, p. 293) speaking of his cases says, "in two instances which we have met with not a trace of tear could be discovered in the walls of the ventricles, which proves that the hemorrhage took place by exhalation." Gintrac admits that blood may be extravasated into these cavities without palpable alteration of their parietes, and refers to it as by exhalation. Rochoux quotes two cases as instances of extravasation by exhalation, but makes no comment upon them. "In very rare cases," says Fox (*loc. cit.*, p. 44), "blood is found in the ventricles without any lesion that can readily account for it, with healthy plexus choroideus and venæ galeni, with floor, and walls, and roof of the ventricles perfectly healthy. In these cases the hemorrhage has been supposed to have been due to a kind of exhalation, but of this there is no sufficient proof." For a similar condition of hemorrhagic extravasation into the arachnoid cavity, Prus (*Mémoire sur l'Apoplexie méningée; Mém. de l'Acad. Roy. de Méd.*, Paris, 1845, tome xi. p. 18) has advanced the opinion that it always occurs by exhalation, but as Ramskill remarks (*loc. cit.*, p. 419) "hemorrhage by exhalation is, however, a pathological phenomenon not accepted nowadays, and for which cases of molecular rupture of bloodvessels used to be mistaken." Watson (*Prac. of Physic.*, Phila., 1872, vol. i. p. 274) maintains that most cases of cere-

bral hemorrhage result from the rupture of a bloodvessel of appreciable size, and this opinion is endorsed by Jones and Sieveking (*Path. Anat.*, Phila., 1854, p. 32). Further on he asserts that exhalation is a condition hardly recognized or admitted by pathologists of the present day, since in such cases, where lesion of an artery of appreciable size cannot be found, numerous ruptures of minute capillaries will easily account for the presence of the effused blood. Suffice it to say here, that it is in the highest degree probable that the existence of free blood extravasation in the ventricles, primary in its origin, depends upon previous laceration of a bloodvessel or vessels, which rupture may be so minute as to escape detection. The mere fact that a rupture is not found does not preclude its presence.

The most common direct cause of primary intra-ventricular hemorrhage is, of course, the rupture of some vessel ramifying on or near the ventricular walls. These, as an anatomical description might readily show, are very numerous. The sources from which the blood may come, are: 1st, the vessels of the choroid plexuses; 2d, the vessels of the tela choroidea; 3d, the arteries ramifying on the ventricular walls, viz., the choroids, branches of the arteries of the corpus callosum, etc.; 4th, the veins, *i. e.*, vena corpora striata, those of the thalamus, the venæ Galeni, etc.; 5th, large aneurisms encroaching upon or existing within the ventricles; 6th, tumours involving neighbouring parts, and passing into the ventricles, or those actually found within these cavities themselves, as medullary carcinomata, gliomata telangiectoides, and true vascular or angiomatous tumours; 7th, inflammatory conditions or ulcerations of the ventricular walls.

The choroid plexus, generally that of the lateral ventricles, is usually designated in the cases collected as the point from which the blood had taken its origin; in fact Morgagni, and with him many of the early writers, seems to have considered its rupture one of the most prominent causes of cerebral hemorrhage, for we find him frequently writing that the blood came from this plexus. Abercrombie states that the blood may come from the vessels of the choroid plexus, and mentions a case recorded by De Haen. Bright (*loc. cit.*, p. 334) makes the following remark upon this point: "It is not improbable that occasionally the choroid plexus is the source of the effusion of blood. Of this, however, I have no direct example to adduce, but I am inclined to believe that those rounded masses of a yellow colour, which are sometimes detected in the posterior portion of the choroid plexus, are the remains of sanguineous effusions which have fortunately proceeded to no great extent, and the blood has gradually undergone a change analogous to that of blood effused under the pia mater." Jones and Sieveking (*loc. cit.*, p. 245) believe that "the greater density of the coats of the vessels in the choroid than in other parts may account for the rarity of their being the sources of hemorrhage; indurated yellow bodies are, however, occasionally found in them which are referable to former effusion." Hufeland, Gintrac, Copland, and Duret may be mentioned as

adherents to this belief, while Gendrin claims that actual ruptures can sometimes be shown, an assertion proved by several of my cases.

CASE 9. Woman, aged 23, primipara, was seized with eclampsia three hours after delivery, and succumbed during the seventh or eighth seizure. There had been marked predominance of the convulsion on the left side. The urine contained albumen in large quantity.

The two lateral and the third ventricles were distended with blood. The walls of the ventricles had not suffered any laceration. On cleaning the specimen under a jet of water, it became easy to satisfy one's self that the hemorrhage had had its origin in the choroid plexus. The pia mater was not the seat of any extravasation, but there was some rachidian meningeal hemorrhage. (Charrier, *Bul. de la Soc. Anat. de Paris*, 2me ed. 1846.)

Morgagni mentions a case in which the hemorrhage was traced to the ruptured vessels of the choroid plexus, while Serres's and Drelincourt's cases, already mentioned, are instances of hemorrhage due to rupture of the vessels of this plexus. It is highly probable that many of the cases, where no cause was discovered for the extravasation, were instances of hemorrhage from the vessels of this part, those of the lateral ventricles being the most common seat.

Rupture of the vessels of the velum interpositum occurs much less frequently than of those of the choroid plexuses of the lateral ventricles. This may, I think, be explained by the fact that the latter have two quite large arterial twigs opening into them, and hence are more directly affected by the varying degree of tension, etc., to which the arterial system is subject. The case recorded by Bright may be quoted as a case of rupture of the velum :—

CASE 10. Mr. N., aged 57, of a spare habit, a temperate liver, of an anxious disposition, subject to be frequently disturbed from his rest by professional engagements, had enjoyed good health up to the 1st of July, 1830. Having been much fatigued during that day he retired to rest about half-past ten, after having made a moderate supper. About half-past one he awoke with feelings of nausea; this was succeeded by several attempts to eject the contents of his stomach, and after vomiting he seemed relieved. Mrs. N. became alarmed by some noise that proceeded from his throat, and summoned his son, who found him in an apoplectic fit, nearly insensible, and breathing with extreme difficulty. Before medical assistance could be obtained, his breathing had become stertorous, his pulse much depressed, and in twenty minutes from his seizure he died.

Autopsy took place in the evening of the day on which he died. The membranes were turgid with dark-coloured blood, and the dura mater adhered very firmly to the bone. The substance of the hemispheres generally appeared to be healthy. On opening the lateral ventricles a large quantity of semifluid blood was found, distending the ventricles exceedingly, and raising up the velum interpositum from the thalami. The corpora striata appeared to be torn on their surface, or rather broken down to the depth of about the fifth of an inch, and beyond this torn part, where the substance seemed to be entire, small dark spots of ecchymoses were discernible. The velum interpositum was also rent in one part; and from the bloodvessels of this membrane the hemorrhage might possibly have arisen. On separating the thalami, the commissura mollis was found torn through by the distending force of the blood, which had found its way into the third ventricle, and thence into the fourth ventricle. The entire quantity of effused blood might amount to more than three ounces. (Bright, *Reports of Medical Cases*, 1831, vol. ii. part I.)

I have met with no instance in which the hemorrhage could be directly traced to rupture of one of the arteries ramifying on the ventricular walls. Hutchinson states that the cause of the extravasation in his case was the giving way of some artery of considerable size, but says nothing of the situation of this vessel. Charcot, however, reports a case of old hemiplegia in a patient fifty years of age, in whom, on *post-mortem* examination, several ochrous foyers were observed at points of the arch of the corpus callosum. Here the blood must undoubtedly have been effused from the branch of the artery of the corpus callosum ramifying on this portion of the ventricular walls.

The blood may come from the veins, especially from those of the corpus striatum and the venæ Galeni, vessels which are of considerable size, and can thus furnish a large amount of blood. This origin is referred to by Gendrin, and Rokitansky states that the hemorrhage may arise from one of the dilated vessels, ramifying on the ventricular walls in cases of rapidly increasing congenital hydrocephalus. Jean Pierre Frank (*Traité de Méd. Prat.*, trad. du Latin par J. M. C. Gouderean, tome ii., 1842, Paris, p. 421), quoting from Walter, says, "when the veins of the brain for a long time distended, become ruptured, the rupture most frequently occurs in the choroid plexus, and the ventricles become filled with blood." Jones reports the following case: A patient died a few minutes after the appearance of tetanic spasms. The parts around the clots were healthy; it was a case of small amount of effusion into both lateral ventricles, issuing from a large dilated vessel in the tænia semicircularis. (L. Jones, *Brit. Med. Journ.*, vol. i., 1864.) The vessel here mentioned was undoubtedly the vena corporis striati, which runs beneath the tænia semicircularis. In Hewett's case a large vein, on the floor of the left lateral ventricle, was laid open, and from this source the hemorrhage arose.

CASE 11. A fœtus of six and a half months was born after a labour of six hours, and immediately expired. On opening the body, M. Cruveilhier found a double ventricular apoplexy; several ecchymoses being situated along the course of the veins which ramify on the surface of these cavities, thus proving, according to the reporter, that here, as in the very large majority of cases observed, the apoplexy of the new-born is venous. (Cruveilhier, *Bul. de la Soc. Anat. de Paris*, 2me ed. 1846.)

Barot reports a case in which the extravasation may fairly be inferred as being of venous origin.

CASE 12. A German, porter, aged 58, in poor health, suffering from bronchitis and venous congestion of the head. In December, after a storm during the night, he was found with eyes closed, in a comatose condition, and incompletely paralyzed on the left side. Incoherence; respiration puffing; pulse natural; face inclined to the right. On the third day he died. His cerebral venous system was found much engorged, and in the right ventricle a blackish clot of two ounces. (Barot, *Thèse de la Faculté de Méd de Paris*, 1818.)

Damming back of the venous blood from whatever cause, either by the pressure of tumours upon the veins, especially those of Galen, by thrombosis of the cerebral sinuses, or by constriction of the neck, etc., may and

have given rise to ventricular hemorrhage. However, it is certain that such conditions undoubtedly not unfrequently produce serous effusion into the ventricles. In the *Transactions of the College of Physicians of Philadelphia*, 3d series, vol. iii. 1877, we find the report of a case by Dr. Arthur V. Meigs, of thrombosis of the cerebral veins, with hemorrhage into the ventricles of the brain. The right choroid plexus was the seat of firm black clots; a firm black clot was found in the veins coming from the right corpus striatum, and the venæ Galeni were plugged. The clot continued on as far as the straight sinus. In the left choroid plexus one or two veins were filled with clot. The ventricles contained much blood, but as the surrounding parts were extensively destroyed, the question whether or no the extravasation primarily involved the ventricles cannot be determined. It is certain that thrombosis of the cerebral sinuses has been known to give rise to meningeal hemorrhage (Nothnagel), and why not an analogous condition in the ventricles? That venous engorgement was the prime cause in Richardson's case can hardly be doubted.

CASE 13. A man attempted to commit suicide by hanging, but was cut down before he was dead. As he was liberated, quite unconsciously he rushed madly forward and fell. He lived three days, and after death extensive effusion was found in the ventricles and the most intense congestion of the cerebrum, the cerebellum being scarcely affected. (B. W. Richardson, *Med. Times and Gazette*, vol. ii. 1867.)

In those cases in which the hemorrhage immediately followed convulsions interference with the return circulation must be blamed as the cause. One such case has already been given. A second is by Morgagni, who records the case in the following terms:—

CASE 14. In the dissection of Madame de Mauvoisin, who died in childbed, apoplectic and epileptic at the same time, I observed that the whole left ventricle of the brain was full of a watery blood, serous, putrid, and discoloured, and that the veins of the plexus testiformis together with the arteries were tumid, as if inflated, and of a black colour. (*Loc. cit.*, from Targioni: *In fine della Deferiz. d'un Tumore Follic.*)

Large intra-cranial aneurisms as contradistinguished from miliary aneurisms may be of three kinds as regards situation: 1, those involving the external vessels of the brain; 2, those seated on vessels in the brain substance; and 3, those affecting the vessels of the ventricles. The first form may by its gradual enlargement cause pressure upon and absorption of the nervous substance intervening between it and the ventricles, and may thus finally encroach upon those cavities into which it may ultimately rupture.

CASE 15. A man, aged 56, had suffered from symptoms of vague import, but of increasing ill omen, of which symptoms three convulsive attacks were part, death occurring in the last. His cerebral ventricles were found full of blood, which had come from a rent in an aneurism, in the middle line of the hinder part of the circle of Willis, just at the divergence of the posterior cerebral arteries. (Hughlings Jackson, *loc. cit.*, p. 245.)

CASE 16. A stout, rather fat woman, æt. 52, mother of several children, was admitted into the Middlesex Hospital, much exhausted, with a very weak pulse, and complaining of violent headache, on April 14th. Towards night she complained of slight weakness and numbness of the right extremities, and at 3

A. M., symptoms of apoplexy supervened, of which she died in four hours. The only account that could be got of her previous symptoms was, that she had been attacked a week before with shivering.

The cranium was very thick, especially in the frontal region, the internal surface of which was lined by new bone, which had probably been deposited during pregnancy. The dura mater was healthy. The left hemisphere of the cerebrum was larger than the right. The convolutions of both hemispheres were compressed and flattened, as was particularly evident on the right side; for the convolutions on the left were separated by effused blood. A large quantity of recently extravasated coagulated blood was accumulated in the arachnoid cavity, and in the meshes of the pia mater all around the anterior two-thirds of the left hemisphere. Both lateral ventricles were filled with coagulum and bloody serum. The hemorrhage was found to have proceeded from an aneurism, which had originated from the extremity of the left internal carotid artery. It lay immediately above the left optic nerve and body of the sphenoid bone, the former of which curved downwards below it, and was elongated and flattened, while the latter was indented and partially absorbed, and it had extended upwards into the substance of the anterior lobe, forming for itself a deep fossa by removal of the perforated plate of gray matter situated at the inner extremity of the fissure of Sylvius, the adjoining roots of the olfactory tract, the anterior part of the corpus striatum, and a considerable quantity of the neighbouring white matter of the anterior lobe. The aneurismal sac was remarkably thin, and it had burst, the rupture taking place on the surface next the ventricle. The rupture of the aneurismal sac appeared to have led also to a slight rent of the lining membrane of the ventricle immediately adjoining, and thus hemorrhage occurred into its cavity, though the greater part of the blood had passed downwards again outside the sac to the base of the brain, and spread out in the meshes of the pia mater. The other arteries of the brain were remarkably healthy. (Moore, *Lond. Med. Gaz.*, vol. xli., 1848.)

A third case is by Hanot.

CASE 17. An insane female, aged fifty years. Death supervened two hours after the appearance of apoplectic symptoms.

Autopsy.—The bones of the vault of the cranium were thicker by a half than in the ordinary state. Nothing abnormal in the dura mater; pia mater and arachnoid healthy. Medium amount of serous subarachnoid effusion. On raising the calvarium, the hemispheres seemed to project from the cranial cavity, in fact bulging very much, especially laterally. A transverse incision at the level of the roof of the lateral ventricles, showed these cavities as well as the middle ventricle completely filled by blackish blood-clots. The fourth ventricle was also filled by a clot. The middle ventricle was destroyed laterally and posteriorly, neither septum lucidum, fornix, tubercula quadrigemina, nor pineal body being found, all these parts being replaced in addition to the blood-clots by a magma of pulpy tissue resembling the lees of wine or a red softening. With the microscope some normal nerve cells, some broken fibres intermixed with blood globules were seen. The inferior third of the floor of the left ventricle was formed by the same reddish pulp. The protuberance, and the entire medulla presented no other alteration to the naked eye. No portion of the tissue of the hemispheres showed foyers of softening or hemorrhage; no signs of encephalitis. At the base of the brain, on a level with the circle of Willis, existed an irregularly spherical tumour, of which the inferior surface was seen extending from the anterior border of the protuberance to in front of the chiasm of the optic nerves, and from the border of one sphenoidal lobe to the other, and measuring about five centimetres in length by three in width. It had pushed the anterior and inferior interhemispheric fissure to the right, and rested external to the right optic nerve, which had a grayish appearance and a sclerous consistence. The chiasm and the left optic nerve were compressed by the tumour, which adhered to the base of the brain over a very limited space only.

On section, this tumour was recognized to be an aneurism, there was a distinct wall, a cavity almost entirely filled by a stratified whitish clot, an open space of about one centimetre in diameter, filled by a soft, blackish clot. By its superior

surface, the tumour had penetrated into the middle ventricle. It was by this wall that the aneurism had ruptured, an irregular perforation of one centimetre in length being found there. It was through this that the blood had been poured out into the middle ventricle, thence passing into the lateral and fourth ventricles, without, however, escaping from the ventricular cavity.

Dissection showed that this aneurism was at first formed at the expense of the left posterior cerebral artery, but in developing had ended by involving the branches given off from the left side of the circle of Willis, and it was noticed that the vessels passing off from this side to enter the brain communicated more or less directly with the cavity of the aneurism. The basilar and other branches presented hardly any signs of atheroma. (Victor Hanot, *Bul. de la Soc. Anat. de Paris*, vol. xlvii., 1874.)

Of the second variety of cranial aneurism the same remarks hold true as of the first, as shown by a case where an aneurism of a small artery of the posterior lobe had burst into the posterior cornu, the blood also escaping on the surface of the brain. The ganglia on the floor of the ventricles remained uninjured. (Hughlings Jackson, *loc. cit.*, p. 522.) Morgagni (*loc. cit.*, p. 42), commenting on a supposed case of intracranial aneurism, refers to the possibility of one of the arteries in the choroid plexus being so affected, the rupture of such an aneurism and the effusion of blood into the ventricles, a fatal apoplexy being the consequence. Nor is such a presumption idle, as facts will prove. In the *Edin. Med. Journ.*, vol. xxii. Part II. 1874, p. 894, we find the history of the following case:—

CASE 18. Female, age 27, symptoms present at 18. Atrophy of the right crus cerebri, and less of the right half of the pons. Lateral ventricles enlarged, especially the right. In the substance of the right anterior lobe, just outside the cornu, lay a red, stringy mass, being a network of vessels seemingly, and in places cavernous tissue. It resembled a tassel, and was of the size of an almond, and communicated at both ends with vessels, at the outer end with a branch of the middle cerebral, which dipped in just above and in front of the island of Reil; at the other with a vessel of the size of a crow-quill, which ran backwards to the line between the corpus striatum and the optic thalamus. Here the artery was dilated at one side into a small aneurism of the size of a green pea; and from the side of the small aneurism sprang a second pouch as large as a walnut, round, smooth, firm, and filled with laminated clot. A fibrous capsule inclosed the larger pouch, continuous with the wall of the smaller one. In the smaller aneurism, and at a spot near the upper part of the large one, was fluid blood. The optic thalamus and corpus striatum were pressed upon and hollowed out by the larger aneurism, which made for itself a bed in these centres. The vessel then passed round the foramen of Munro, which it entered side by side with the anterior end of the choroid plexus, with which, however, it did not seem to communicate. It then turned backwards, and ended in the enlarged veins of Galen, inclosed in the velum interpositum. (Alex. Robertson and D. Foulis, *Edin. Med. Journ.*, vol. xxii. 1877, p. 894.)

This was in all probability a case of aneurism of the anterior choroid artery, which sometimes arises from the middle cerebral artery. Dr. Robertson states that he had met with a similar case a number of years before. In a case reported by Van Der Byl, rupture of such an aneurism actually occurred.

CASE 19. J. E., æt. 56, had fallen down in a fit, and was brought to the Middlesex Hospital, where he died while in the waiting-room. External surface

of the dura mater much congested, the meningeal arteries distended; pia mater much congested; convolutions of the brain flattened; substance pale. On opening the lateral ventricles about one ounce of bloody serum escaped, and black clots were found occupying both cavities, the right ventricle being entirely filled with coagula. The septum lucidum was softened and broken through. On carefully removing the coagula from the right lateral ventricle, an elastic tumour, about the size of a hen's egg, was discovered in the middle or descending cornu of the lateral ventricle; it seemed attached to the hippocampus major, and growing into the ventricle; the surrounding brain substance was softened and broken up, and presented a yellowish gelatinous appearance, mottled with pink spots. A slight stream of water washed away all the softened brain substance, and left an irregular, rough, villous cavity, in which the tumour remained suspended. On section, this tumour exhibited a laminated aspect, as if composed of concentric fibrinous layers, which differed somewhat in colour, some being dark, others light. On minute examination the tumour was found attached to an artery entering the middle cornu of the ventricle, along with the velum interpositum, and on tracing the vessel to the base of the brain, it was found to be the posterior cerebral artery—one of the branches of the basilar which, after winding round the root of the cerebrum, entered the brain in the manner just described. (Van Der Byl, *Trans. of the Path. Soc. of Lond.*, vol. viii. 1856.)

The origin of this tumour is rather doubtful, but it seems to have been given off from one of the posterior choroids, though it must be admitted that the course described as taken by the artery from which it arose is not exactly that of either of these vessels.

Tumours when involving or extending into the ventricular space may give rise to hemorrhage in the same manner that they do when developed in the brain substance. Of course this is most apt to occur in cases of highly vascular enlargements, such as true vascular tumours, angiomas, medullary carcinomata, tumours of the pineal body, or gliomata telangiectoides. Vascular erectile tumours have been observed in this neighbourhood, and the possibility of their rupture must be borne in mind. In one instance, described by Lebert, the growth was lodged in the right lateral ventricle, and was developed from the choroid plexus. Guerard reports the case of a child, three years of age, in whom he found a bluish-red tumour of the volume of a hen's egg, seated at the posterior extremity of the right lateral ventricle, dependent from its choroid plexus, and consisting of dilated and very sinuous vessels. In another case reported by Förster, a telangiectatic tumour of about the size of a pigeon's egg was found in the third ventricle, involving its choroid plexus, consisting of spindle-shaped and sacciform dilated capillaries, and actually the seat of numerous extravasations. Virchow (*Path. des Tumeurs*, trad. par Paul Aronssohn, Paris, 1876, p. 153) affirms that the most frequent seat of angiomas is the floor of the fourth (?) ventricle, the red points found in their neighbourhood being the effect of small blood extravasations.

Dr. James Robertson reports in the *Dublin Medical Press*, March 28, 1860, p. 257, an interesting case of a large tumour in the right lateral ventricle, presenting the appearance and consistency of medullary matter, except at several points, where it was of a red colour and highly vascular. Rokitsky has seen two cases of cancer of the ventricles, one a medullary

carcinoma seated in the fourth, the other an alveolar carcinoma involving one of the lateral ventricles. Hooper (*The Morbid Anat. of the Human Brain*, London, 1828, p. 62, Plate XII.) gives the representation of a large cephalomatous tumour projecting into the fourth ventricle. Wallmann has found in one and the same subject a colloid cyst of the third ventricle and a lipoma in the choroid plexus of the right lateral ventricle. In an earlier portion of this article we have mentioned several instances of dermoid cyst of the ventricles. These cases merely establish the possibility of intra-ventricular hemorrhage from such a source, viz., ventricular tumours, but such a possibility is made a certainty by the following case:—

CASE 20. M. B., aged 35, admitted to an asylum as insane, where he remained but a short time, death occurring suddenly with symptoms of apoplexy.

Dissection.—Dura mater tolerably firmly adherent. Convolutions much flattened and extremely dry; pia mater difficult of separation, particularly in the middle and superior part, but did not remove any laminae of brain with it. Cortical substance everywhere of a high colour, particularly on anterior lobe, white substance exhibited none of the well-known dots of blood. Cerebral vessels on the surface contained but little blood. On cutting into the ventricles it appeared that the pia mater investing them was very much thickened, so that the white cerebral substance could easily be separated from it. On opening the right rather dilated ventricle, whence a considerable quantity of clear serum flowed, we came on a rather long vesicle studded with some dark brown vesicles, immediately under the fornix and great commissure, in the situation of the foramen of Munro, which here appeared largely dilated; the length of the vesicle, from before backwards, was five and a half centimetres; on the right side the corpus striatum and thalamus were apparently healthy, somewhat pushed to the side, the walls of the vesicle passed uninterruptedly into the walls of the ventricles so that it appeared that the pia mater which lines these cavities internally also invested the vesicle.

At the level of the great commissure the cerebral mass expanding over the left ventricle appeared to be much more swollen; the investing membrane was here much denser and thicker, and could not be torn without difficulty. On opening the ventricle much bloody serum escaped, contrasting with the right cavity, where the serum was clear. The cavity of the anterior left cornu was about as large as a duck egg, and was filled with recent coagulated blood. It now appeared that the vesicles in the right cavity were connected with those in the left, as they were full before the opening of the left ventricle, but collapsed after it. About in the situation of the thalamus under the fornix was a bloody yellow, soft substance, presenting the appearance of medullary fungus coloured with blood. The vesicle in the right cavity was covered with a membrane composing the lateral wall of the septum lucidum and passing into the investing membrane of the ventricle, so that also anteriorly the wall of the vesicle passed into the investing membrane of the cornu anticum. The left ventricle was much more distended owing to the presence of an abnormal medullary body; it was partly filled with coagulated blood, which was also separately effused in several parts of the tissue; on the left side, the sac extended into the cornu posticum, to the commencement of the calcar avis, covered by an organized membrane; which again was connected with the walls of the ventricles, and was uninterruptedly continued into them. On accurate examination, after the brain had been for a couple of days left to harden in spirit, it was seen, by lifting up the posterior portion of the corpus callosum, that the abnormal body was continued backwards through the very dilated third ventricle, and here terminated, just in front of the corpora quadrigemina, which were more or less flattened, and that the tumour consisted of a degeneration of the pineal gland. This was reduced to a matter of certainty by the microscopic examination made by Profs. Schroeder van der Kolk and Harting; thus in the tumour, even on a level with the corpus striatum, the peculiar conglomerations were found constituting the so-called cerebral sand, which was here present in great quantity as mulberry-like granules, and is distinguished from the sand in

the choroid plexuses, which latter always exhibit spherical globules. The choroid plexus in each ventricle was normal and was not connected with the tumour; the tumour itself appeared under the microscope to consist chiefly of granular cells of the size of blood-corpuscles, from which, however, they were plainly distinguished by their granular contents, their unequal and mostly oblong form, without any defined nucleus; these cells were everywhere, both on the surface and the investing membrane and within the tumour, exactly similar, and between them were capillary vessels arranged in a reticulated form, and connective tissue. Nerve fibres were not to be distinguished with certainty. . . . Death was the result of an effusion of blood from the tumour into the left ventricle producing rapid and excessive pressure and distension, attended with sudden arrest of all the phenomena of life, without the manifestation of any convulsive movements. (Wm. D. Moore, *Dublin Med. Press*, March 28, 1860, p. 255; from *Geneeskundige Courant*, 25th Dec. 1859.)

The fact that hemorrhages may be dependent upon inflammation of the walls of the ventricles has already been referred to. Hooper (*loc. cit.* p. 34) states that "ulceration, the consequence of inflammation, is occasionally seen on the surface of the ventricles. I have found an ulcer on the corpus striatum, and in another subject one on the outer wall of the right lateral ventricle; and, in both instances, it seemed as if a small abscess, the size of a split pea, had ruptured into the ventricles." Copland places the most frequent seat of this ulceration over the corpora striata. If such an ulcerative process involves one of the vessels, the result would, of course, be an intra-ventricular hemorrhage.

Does atrophy of the brain ever enter as a factor in the production of primary ventricular hemorrhage? To this I answer, decidedly yes! However, Nothnagel (*loc. cit.*, p. 74) believes that "still less foundation is there for the view that a primary atrophy of the cerebral substance is to be reckoned among the causes of hemorrhage." According to Leubuscher and Niemeyer gradual atrophy of the brain induces dilatation, and finally may produce rupture of the bloodvessels. The latter also further adds that a second attack of cerebral hemorrhage is, in many cases, brought about by the atrophy of the brain, which, he thinks, the first seizure induces. In dementia paralytica, in which there is atrophy of the brain, we find the ventricles more or less dilated, especially the cornua, and here we frequently find hemorrhages beneath the dura mater, and in many cases the *état criblé* on section of the medullary substance indicating "abnormally dilated red vascular cavities" (Hitzig). Dr. Edward Long Fox, among 700 post mortems of insane cases, found effusion of blood in various situations 131 times, and of these 20 times was blood found in the ventricles, but as I am unable to obtain the details of these cases, the variety of insanity, the form of the ventricular extravasation, whether primary or secondary, cannot be determined.

The vessels of the membrane lining the ventricles are, following Hooper (*loc. cit.*, p. 33), sometimes found much enlarged and distended with blood when a fluid is collected in these cavities so as to increase the size of the ventricles. According to Rokitansky in cases of congenital hydrocephalus, where dilatation of the ventricles is going on, and hence where we find a

somewhat analogous atrophic condition of the brain as in general paralysis of the insane, hemorrhage is very apt to occur from the enlarged vessels ramifying on their walls. Wilks (*Lects. on Path. Anat.*, London, 1859, p. 145) has noticed that "in cases of chronic atrophy of the brain, and in old people, it is not uncommon to find a cystic formation in these bodies (choroid plexuses), thus showing an interdependence between these plexuses and the condition of the brain." The fact that ten of my cases had previously suffered from more or less well-marked attacks of cerebral hemorrhage, seems to lend strength to the theory that atrophy of the brain can bring about a ventricular extravasation of blood, and such a belief is strengthened by several cases recorded.

CASE 21. A male, aged 52. Sudden death. *Head*.—Opacity of the arachnoid. There was flattening of the convolutions. The lateral ventricles contained between five and six ounces of fluid. A clot of blood, one drachm in weight, presented itself at the foramen of Munro, and filled the third and fourth ventricles. The corpora striata appeared wasted; not so full or so firm as natural. The medulla was slightly permeated by blood at the origin of the pneumogastric nerves. Weight of brain 48½ ounces. Heart enlarged, 17 ounces. (R. Boyd, *Edin. Med. and Surg. Journ.*, vol. lviii. 1847.)

CASE 22. B., aged 20, insane for many years. One day, after a large meal, he suddenly sank to the earth. Complete abolition of sensation and motion; respiration difficult and noisy; pulsations of heart very violent; face pale; a little froth issued from his mouth; no convulsion. The patient died twenty minutes later, without having regained consciousness.

Autopsy.—Convolutions flattened; the anterior lobes had suffered a notable arrest of development. The encephalon, on removing it from the cranial cavity, had the appearance of a single hemisphere; the meninges were normal. In the left lateral ventricle a hemorrhagic mass of the size of a large hen's egg was found. Another one of the size of a bean was also discovered in the fourth ventricle. This second clot had been probably detached from the collection in the other ventricle, and had traversed the aqueduct of Sylvius. The other parts of the brain did not appear involved. The principal arteries, however, were markedly atheromatous. Heart very large.

M. Bouchard examined a portion of the brain bordering upon the clot, and had no doubt that the hypertrophy of the heart was to be considered a predisposing cause in the production of the hemorrhage; but he thought it depended especially upon the alteration of the vessels of the brain. In fact, all the arterioles of the brain were diseased, there being a notable multiplication of the nuclei in their lymphatic sheaths, in the adventitia and intima; and less muscular fibres were met with than in the normal state. But most important of all small aneurisms were discovered. (M. E. Brémond, *Bul. de la Soc. Anat. de Paris*, tome xlii. 1867.)

In a few cases primary softening seems to have favoured the occurrence of the effusion into the ventricles, perhaps as pointed out by Jackson, by diminishing the support of the bloodvessels; and, what might be added, by the probable coincident degeneration and weakness of the vascular walls.

CASE 23. A female, about 60, subject to fits, not strongly marked by convulsion, from a very early period of life. At 8 o'clock she was found on the floor, where she had fallen while washing herself, unable to rise, but perfectly sensible. Her speech was altered. She continued sensible until about 11 o'clock A. M., when she gradually became unconscious; and at 4 P. M. was in a state of profound coma. The measures resorted to for her relief were of no avail, and she

died at 3 o'clock the following morning, nineteen hours from the commencement of the attack.

The head was examined thirty-six hours after death. The substance of the brain was wounded in removing the calvarium, and a considerable quantity of blood flowed out. On the surface of the left hemisphere two thin plates of bone were found, of small size, and in the superior longitudinal sinus were two others, about an inch in length and one-sixteenth in thickness at the thickest part. The substance of the brain was generally soft. The floors of the lateral ventricles were stained with blood, which had filled them, but which had mostly escaped on opening the cranium. The softening was most marked in the posterior corner of the right ventricle, and in parts presented almost the appearance of pus. (Woodfall, *Lancet*, vol. i. 1850.)

CASE 24. A female, aged 72, died in La Salpêtrière. Usually felt well, save a slight feebleness in one of her legs. This difficulty had increased during the last few days, and of late she had complained of some dizziness, pain in the head, and constipation, and also of cramps in the legs. One day, after a large meal, while near her bed, she suddenly fell, and had some convulsive movements. Being conveyed to the infirmary, she was in a state of complete prostration, skin cold, pulse small and frequent, respiration stertorous, insensible, no answers to questions, eyelids closed, pupils immobile and slightly dilated, involuntary discharge of urine, no contracture. The next morning all these phenomena persisted. The patient lay upon her back, no contracture, motionless, mouth deviating to the left, froth issuing from the mouth, and died during the morning visit.

On *autopsy*, nothing was found outside of the encephalon, the ventricles of which were filled by a considerable hemorrhage, which had made its way from the left ventricle into the middle ventricle, the roof of which it had raised, and thence into the right ventricle. There was no alteration of the nervous substance except in the left ventricle, the external wall of which was evidently softened by a process antedating the hemorrhage, but which was not very old. The blood extravasated was recent and semi-coagulated. (Viallet, *Bul. de la Soc. Anat. de Paris*, vol. xxi. 1856, p. 318.)

In another case the brain-substance was universally softened, but the reporter finds himself unable to decide whether the condition was a post-mortem one or not.

As in ordinary encephalic hemorrhage, so here we find two conditions usually present, whose conjoined action tends to bring about the occurrence of an intra-ventricular extravasation of blood: 1, disease or weakening of the vascular walls; and 2, increased vascular tension, whether due to a *vis a tergo* or to a *vis a fronte*.

Degenerations or diseases of the walls of the cerebral bloodvessels seem here quite common; for in twenty-six cases in which their condition is mentioned, in only three are they described as healthy. In the twenty-three cases in which a diseased state was noted, twelve times there was more or less extensive atheroma of the vessels at the base, and presumably of other vessels of the brain; six times there were aneurismal dilatations, the aneurisms being of comparatively large size; in one case it is stated that to a vessel running through the right lateral ventricle, possibly to one of the choroids, a small firm bilobed body was attached, no further information being given of the character of the tumour, which may have been a consolidated aneurism. In one case there was a marked dilatation of a vessel, probably a vein, beneath the tænia semicircularis; in another, varicosity of the bloodvessels of the brain; in still another,

the finer arteries are described as being enlarged; while in one case the carotid is referred to as being dilated. In Abercrombie's case he states that a peculiar diseased condition existed.

As regards the condition of the vessels which are directly concerned in intra-ventricular hemorrhage, but little can be said. The larger vessels of the choroid plexuses may, according to Haeckel, be the seat of various forms of degeneration, such as chronic inflammations, fatty changes, pigmentary and calcareous deposits, dilatations, elongations, etc. He points out as especially noteworthy varices of the vena choroides. According to Fox, "Hemorrhage of the cerebral ventricles may occur from various morbid conditions of the plexus choroides. The plexus may be more vesicular than usual, with vessels greatly distended with blood, and showing ruptures in several places; or, indeed, engorged from any cause that interferes with the normal flow of blood through these vessels." We have seen that they may be affected by aneurismal enlargements, to the rupture of which the hemorrhage was due in two cases quoted. Thrombosis may occur by extension from the sinuses and larger veins. The vessels ramifying on the walls of the ventricles may be much enlarged and dilated, and distended with blood, especially when fluid is collected in these cavities (Hooper), being usually marked in cases of rapidly increasing congenital hydrocephalus (Rokitansky, Förster). The presence of angiomatous tumours, usually appended to the choroid plexuses, has already been mentioned. Cysticerci have been found attached to the choroid plexuses. Broca mentions such a case in a man who died of apoplexy, while two other instances are related by Fischer, where the parasites were attached to these plexuses. The presence of simple serous cysts growing from these vascular membranes is not uncommon in the old; they may be single or multiple, vary much in size, and contain a clear serous fluid. Wilks has found them in cases of chronic atrophy of the brain. In several of my collected cases they were present. Fatty degeneration of the capillary walls being very common in the young, we might perhaps find in this a partial explanation for the relatively frequent occurrence of ventricular hemorrhage at a comparatively early age. But in the one case of this kind in which the condition of the cerebral vessels was determined by the microscope, nothing abnormal could be found.

The exact bearing of the miliary aneurisms, as described by Charcot and Bouchard, on this form of intra-ventricular extravasation I am unable to satisfactorily or positively determine, but the presumption is, that the ventricular vessels resemble the other vessels of the brain in their relation to this form of vascular disease, a presumption strengthened by the following cases:—

CASE 25. Jeanne Lasnier, æt. 82. Apoplexy with incomplete left hemiplegia of sensation and motion. Recovered, but died two years later of pneumonia.

On *autopsy* an ochrous foyer was found with approximated walls, of the size of a large almond, outside of the extra-ventricular nucleus of the right corpus

striatum. Miliary aneurisms were found in the corpora striata, and a similar aneurism in the choroid plexus of the left ventricle. The arteries at the base were not markedly atheromatous. (Charcot and Bouchard, *Arch. de Phys. Norm. et Path.*, tome i., 1868, p. 663.)

CASE 26. Male, aged 72, died Oct. 12, 1865. Capillary ectasie were found upon the vessels of the parietes of the lateral ventricles, and hemorrhage into the right corpus striatum. The large arteries were atheromatous. (*Ibid.*, *loc. cit.*, p. 730; observed by Heschl.)

A more direct relation to the subject under discussion can be found in the two cases where primary extravasation took place into the ventricles, in which such miliary aneurisms were actually found. One of these was Brémond's case, which has already been given. Another is by Lamblin. Here the seat of the ectasie is unfortunately not noted. In one case, Bright's, we find a great arterial tension described, without, however, any cardiac enlargement, as having always existed, the pulse being remarkable for its force, "having more resemblance to a horse's than to a human pulse;" added to which we find another factor in this case, great exertion and bodily fatigue. In another instance, where bodily exertion is mentioned, we find several other causes whose conjoined action seems to have brought about the fatal extravasation. This was one of Morgagni's cases, sudden changes from hot to cold weather, exposure to the direct rays of the sun, the use of undiluted wines, together with bodily exertion, coincidentally existed as exciting causes. In ten cases hypertrophy of the heart was present, but in seven of these we find coexisting degenerations or changes of the walls of the cerebral vessels.

In one patient sudden chilling of the cutaneous surface is noted as immediately preceding the initial symptoms of the attack. Here we must suppose the sudden contraction of the surface capillaries with consecutive engorgement of the internal organs, those of the brain yielding to the sudden internal pressure.

Venous congestion may be suspected in the four cases in which the hemorrhage followed the ingestion of food. In one of these the stomach and intestines were found, on *post-mortem*, distended by raw turnips; and in a second the patient is described as having eaten an enormous dinner the day before; while, in the two others, the attack came on just after partaking a large meal. In Richardson's patient the connection between encephalic venous engorgement and the ventricular hemorrhage can more easily be understood.

Whether or no the blood-changes of Bright's diseases bear any definite relation to primary intra-ventricular hemorrhage, I find myself unable satisfactorily to determine, as in only one instance, a case of extensive kidney degeneration, can it be supposed to have existed. In all but a few cases the condition of the kidneys in the *post-mortem* description is ignored, and hence my cases are useless in the decision of this question.

Arguing from the fact that certain blood-diseases, such as leucocythæmia, idiopathic anæmia, purpura hæmorrhagica, scorbutus, the hemorrhagic dia-

thesis, pyæmia, typhoid fever, and icterus, have been known to give rise to hemorrhage into the brain-substance or meninges, the supposition would be that a similar relation held between them and primary ventricular hemorrhage. Such a presumption is, at least, verified and rendered a certainty in the case of several of these blood-diseases, *i. e.*, leucocythæmia, scurvy, and purpura; cases having already been reported where the two conditions coexisted, the hemorrhage undoubtedly being dependent upon the previous blood affection.

Morbid Anatomy.—The amount of blood extravasated, the situation in which it is found, and the condition in which it exists, vary greatly in the different cases of primary intra-ventricular hemorrhage. As many of the points coming under the head of pathological appearances have already been dilated upon in a previous part of this paper, their extended discussion need not detain us here.

We have seen that in some instances of acute hydrocephalus we find the ventricular effusion which occurs in this disease blood-stained to a varying degree, never to a point distinctly hemorrhagic. However, such are rather to be considered the exception than the rule. Thus Huguenin (*Ziems-sen's Cyclopædia*, vol. xii. p. 499) states that "sometimes the fluid (in meningitis tuberculosa) is slightly tinged with blood, and the source of the bleeding will be found in the plexus choroidei." Meigs and Pepper characterize this form of effusion, the sero-sanguinolent, as rare in tubercular meningitis, as does also Hammond. True, such cases can hardly be considered as having attained the dignity or degree of a veritable ventricular hemorrhage; they should rather be deemed instances merely of bloody admixture, the inflammatory trouble having been unusually intense, the escape of blood-corpuscles through the vascular walls probably having occurred without actual solution of continuity, that is per diapedesis. Similar conditions have been observed in other cases of serous inflammation, as in pleuritis, peritonitis, pericarditis, etc., and in fact cases have been reported where actual hemorrhages have supervened dependent upon the inflammatory state directly, and we have seen, as in the case of Goelis, that the same holds true of ventricular hemorrhage. We may here mention the fact that Gendrin speaks of simple cerebral hyperæmia as related to ventricular hemorrhage, affirming that in such cases an augmentation in the cephalo-rachidian fluid occurs to so great a degree that the lateral ventricles become filled with a serum stained by an admixture with a small quantity of blood, and that in some instances this admixture may become so excessive that actual clots may be found in the serum. Such cases he considers actual instances of ventricular hemorrhage. The blood may remain confined to the ventricle into which it is originally extravasated, which it may in part or completely fill; or, by direct continuity of cavity, it may extend into several or all the other ventricles. It is here to be remembered that, although during life the blood may have remained

localized to one or several ventricles, it may become diffused after death throughout the entire ventricular space, and may even escape externally. Hence the difficulty with which we meet in attempting to determine the exact seat and extent of the original extravasation. This applies more particularly to those cases where the blood is found in a fluid state.

If the blood be rapidly and copiously poured out it will cause rupture of the septum lucidum, and thus make its way into the other ventricles by a forced passage; but when more slowly effused it usually follows the course of the normally existing channels. When confined to a single ventricular space, it generally only partially fills that cavity, the hemorrhage, as might be expected, being in such cases slight. It is in one of the lateral ventricles that such a localization of the blood is most apt to take place, the third ventricle being rarely so affected, and the fourth still less so. Thus, of my 94 cases, 24 were confined to one lateral ventricle, 2 to the third, and only one to the fourth. When in a lateral ventricle alone it may entirely fill its cavity, extending into all the cornua, or it may be only found in the body or even in one cornu, usually the descending, around the choroid plexus. In fact small hemorrhages are quite frequently found in this latter situation in the form of an elongated clot curled around its vessels, or more or less firmly attached to this structure. When confined to the third or fourth ventricles they fill their cavities entirely. Large hemorrhages are, however, the rule. The blood poured into one cavity rapidly fills it, distending it sometimes to a very great degree, then passing through the various foramina quickly, it rapidly and successfully invades the others, in turn filling and distending them. If, for instance, the extravasation has primarily occurred into one lateral ventricle, it passes through the foramen of Munro into the third, thence through the other foramen of Munro into the opposite lateral ventricle. This is the most usual course, but frequently the extravasation is far more abundant, and in such cases the blood in addition passes down the iter into the fourth ventricle, at which it may stop, or passing through the foramen of Magendie or the two aperturæ laterales spreads out over the surface of the brain to a greater or less extent. If the hemorrhage first take place into the third ventricle, it may spread laterally into the two lateral ventricles, or, as frequently happens, passes downwards into the fourth, or it may even spread in all directions, filling the entire ventricular space. The most frequent direction taken under these circumstances, that is when the hemorrhage originally occurs into the third ventricle, is downwards into the fourth ventricle. When the extravasation first appears in the fourth ventricle, it generally passes upwards through the iter, but it also sometimes makes its way externally, or even is diffused in both directions.

The degree of diffusion of the blood depends to a great extent upon the amount extravasated. If small it remains confined to a single ventricle;

if larger it spreads to one or more of these spaces; if great it occupies the entire ventricular space; and if excessive it is not only found in all the cavities, but also upon the surface of the brain. This, of course, is modified, by the original seat of the effusion, applying more particularly to that of the lateral ventricles, where hemorrhage of this form is by far the most frequent.

To show the relative degree of frequency and the seat of primary ventricle hemorrhage, and also its relations to the secondary form, I have arranged the following table. The secondary cases were obtained from Durand-Fardel's work already quoted.

	SECONDARY.		PRIMARY.	
	Cases.	Per cent.	Cases.	Per cent.
In all ventricles	20	30.30	32	34.04
In both lateral ventricles . .	23	34.85	16	17.02
In one lateral ventricle . . .	16	24.24	24	25.54
In third ventricle	1	1.52	2	2.13
In third and one lateral . . .	.....	.....	3	3.19
In third and fourth	1	1.52	3	3.19
In fourth ventricle	4	6.05	1	1.06
In fourth and one lateral . .	1	1.52	1	1.06
In fourth and two lateral . .	.....	.....	1	1.06
In third and two lateral . . .	.....	.....	9	9.58
In third, fourth, and one lateral .	.....	.....	2	2.13
Total	66	100.00	94	100.00

In 19 of my cases the ventricular extravasation was accompanied by meningeal hemorrhage, in only 11 of which can the latter be said to have been directly connected with the former; for in 8 of these cases the blood in the ventricles was found only either in the two lateral ventricles, 4 cases; in the two lateral and the third, 3 cases, and in one case in one lateral ventricle only. Of the 11 cases mentioned, in 9 the extravasated blood was present in all the ventricles, in one in the third and fourth, and in one in the fourth only.

The blood may be found in a fluid, semi-coagulated, or completely coagulated state, or several small clots may exist together with fluid blood. Hammond (*loc. cit.*, p. 89) affirms that "the blood extravasated into the ventricles remains liquid a longer time than when effused into any other part." This statement I do not find borne out by facts; for, although death is usually rapid, generally within twenty-four hours, yet the blood is in the great majority of cases found either firmly or in part clotted. The condition of the extravasation does not depend upon the situation, but rather upon the amount and degree of rapidity with which death has ensued. Small hemorrhages are almost always firmly coagulated, large ones less frequently so. In those cases where death has been instantaneous or

rapid, the blood is, as a rule, in a fluid state; whereas, if death has occurred later on, it is either semi-coagulated or forms a dense firm clot. However, in the large majority of cases it is completely clotted, and in such, if it has been large in amount so as to fill the ventricles, it usually forms a complete cast of these cavities, cornua, foramina, etc.; as, for instance, in Dulles's and Key's and Retzius's cases already mentioned. Where the blood has been poured out into several ventricles and where it is found intermixed, that is, in both the fluid and clotted form, this latter is usually found diffused throughout the several cavities, but in a few instances the clots were found confined to one or two spaces, the fluid blood to the others. Here the possibility of several successive and distinct effusions is to be borne in mind. The clots may be soft and almost gelatinous, firm and hard, or, as in a few cases, almost fibrous. They may be found free in the cavities, or may be agglutinated to the ventricular walls. This latter condition is, however, rather the exception. Their shape of course varies with the amount of blood poured out and with their seat; the small clots being generally elongated and curled around the choroid plexus, the larger ones forming more or less complete casts of the cavities, or, when the hemorrhage is general, a perfect cast of the entire ventricular space.

The fluid blood may consist of pure blood or of an intermixture of serum and blood in varying proportions. It also may remain confined to a single ventricle or may spread to all the others. It usually coexists with clots, but in a few instances fluid blood alone was found.

Where one or several of the ventricles have remained free of blood they are in the majority of cases filled with serum, either pure or more or less blood-tinged, the rule being where hemorrhage has occurred to any amount all the ventricles are filled by blood, but if any remain free they are almost sure to contain serum, those cases only being excepted where the extravasation has been very small in quantity. The ventricular parietes may be perfectly normal or intact; they may be blood-stained from imbibition of blood pigment; they may be lacerated or torn; or may be in a state of softening more or less extensive.

In the large majority of cases absolutely no sign or trace of laceration or other abnormal condition of the ventricular walls can be discovered even on the closest scrutiny. In 70 of my collected cases such was the fact. It is of such that we may most positively speak as undoubtedly primary or immediate; yet as we have already seen there is no doubt that laceration may be secondary to the extravasation. Of the 23 cases where tearing occurred, the laceration in 19 was confined to the walls of the ventricles proper, or to the septum lucidum, not encroaching on the ganglionic masses. The seat, extent, etc., of these lacerations have already been pointed out.

Imbibition of blood-colouring matter with or without coexisting softening of the walls seems to be very rare indeed, at least it is but seldom

mentioned in the records of the cases collected. My impression is that it is a post-mortem affair depending upon the same conditions ordinarily found in autopsies. Still in some few cases it is possible that it occurred during life, more especially where it coexists with laceration or softening.

When we discover a laceration in the parietes of the ventricles, the natural inference would be that it was primary, that is, that it preceded the ventricular extravasation; but the absence of a hemorrhagic foyer in the brain substance connected with it, a normal condition of the brain proper, the coexistence of lacerations at other points in the walls, and more especially the inability to discover in the brain substance any vessel from which the blood might have come, all point to it as secondary to an immediate ventricular hemorrhage. If a ruptured vessel be found in one of these cavities, the matter is settled. However, it is no more than fair to admit that all these conditions, excepting perhaps the last, may exist and yet the extravasation be secondary; thus the blood may come from the rupture of numerous capillaries in the immediate vicinity of the ventricles causing many lacerations and filling up of these spaces. Still such an accident must be very rare. Lacerations are, however, rather the exception, occurring in a small percentage of the cases only, and then involving usually the walls of the lateral ventricles, less frequently those of the third, and rarely those of the fourth. In some instances they involve the septum lucidum or fornix singly or conjointly. Sometimes the septum is simply perforated, sometimes simply torn across, and in a few cases it is completely torn away and destroyed. The same is true of the fornix, though to a less and more infrequent degree. The explanation of these lacerations I have already given, and therefore need not repeat it here. Usually they are slight, generally single, sometimes multiple, two or even more being found at various points, almost always affecting the walls proper of the ventricles, very rarely the ganglionic masses, and then only to a very superficial degree. Mostly of slight depth, they sometimes extend to a distance of two or three lines.

Softening of the walls is rare, but when present may be due to previous disease, or may be dependent upon the hemorrhage directly, which, however, is very infrequent. The possibility of *post-mortem* softening must here also be remembered.

The choroid plexuses may be found pale and anæmic, or congested and swollen, their condition varying greatly, the former seeming, however, to be the rule. The bloodvessels coursing along the walls are generally collapsed, though they also are sometimes dilated and distended with blood.

The blood being extravasated into the ventricles may disappear by absorption completely; its fluid portion may be absorbed, while its solid parts remain undergoing calcareous or other changes; it may, perhaps, induce chronic internal hydrocephalus; it may give rise to simple serous

cysts; it may cause acute ventricular meningitis; or it may remain for a long time almost unchanged and unacted upon.

That blood thrown out into the ventricles may be absorbed is hardly to be doubted in the light of our present knowledge, but the facility and manner of such absorption must, of course, vary somewhat with the amount, situation, etc., of the extravasation. According to Wagner (*Manual of Gen. Path.*, trans. by Van Duyn and Seguin, N. Y. 1876, p. 220) hemorrhages into pre-existing cavities or canals behave in quite a simple manner. In hemorrhages into serous cavities the blood is not rarely entirely absorbed; thus, as in hæmatothorax and hæmatocele, Wilks, Jones and Sieveking, Nothnagel, Huguenin, and others hold the same opinion. Effusions of blood into the pleural cavities, into the pericardial sac, or into the tunica vaginalis have, in not a few cases, been completely absorbed. We have but to mention the experiments of Wintrich to prove the possibility of such an occurrence. He found in animals, in whom an artificial hæmatothorax had been produced, complete absorption of the blood in seven or eight days. Huguenin (*Ziemssen's Cyclop.*, vol. xii. p. 423) affirms that there are a number of cases which show that a comparatively large extravasation, in cases of pachymeningitis interna hæmorrhagica, may be absorbed.

It has been maintained that the blood in ventricular hemorrhage cannot be absorbed (Gendrin). Although this is not true, yet it must be admitted that blood extravasated into the ventricles is but slowly absorbed, and that the rapidity of such absorption varies with the different cavities, being most rapid in the lateral, and probably slowest in the third. To establish this we must look in part to the secondary form for corroborative testimony, as but few cases of the primary form can be deduced in evidence, as death in the large majority of cases rapidly ensues. Roberts states (*loc. cit.*, p. 834) that when venous blood collects in the ventricles, referring to the secondary variety, it is not very readily absorbed, and in many cases becomes organized. Frequently in *post-mortems* on cases which long before have suffered from cerebral hemorrhage, which undoubtedly had ruptured into the ventricles, ochreous patches are found along the ventricular parietes, showing distinctly their hemorrhagic origin. Many such cases have been reported, more especially by Charcot. Besides, cicatrices are not infrequently found on the walls of these spaces, pointing positively to previous laceration and extravasation.

Bright (*loc. cit.*, p. 334) says: "I am inclined to believe that those rounded masses of a yellow colour, which are sometimes detected in the posterior portion of the choroid plexus, are the remains of sanguineous effusions which have fortunately proceeded to no great extent, and the blood has gradually undergone a change analogous to that of the blood effused under the pia mater." Ramskill (*loc. cit.*, p. 423) remarks: "In connection with the choroid (that intra-ventricular appendix of the pia

mater) the adventitious products found have been indurated yellow bodies, the remains of former hemorrhagic effusions," etc. etc. In autopsies it not infrequently happens that fibrous or even calcareous bodies are found appended to the choroid plexuses, almost always those of the lateral ventricles, and, as we must admit with Bright and Ramskill, the existence of such bodies can be explained only on the supposition that they are the remains of old clots which have, in great part, undergone absorption.

As a rule, the clot in primary ventricular hemorrhage is found unchanged, though in some cases, where death has occurred relatively late, it had already begun to undergo changes. Thus, in a case where death took place on the fifth day, the clot is described as having begun to assume a fibrous appearance; in another, death supervening on the twelfth day, the clot is said to have been firm, and partly organized. Usually, however, the blood is found in a simple, unchanged condition, having merely undergone coagulation.

In the few cases in which recovery took place, although death occurred long after from other causes, yet, in every instance remains of the old extravasation were found, bearing distinct signs of hemorrhagic origin. The most striking of these cases is that by Bossu:—

CASE 27. A road labourer, aged 24, generally healthy, but frequently suffering from colds, while sweating profusely, a year ago, lay down on the damp ground. On rising, he complained of extreme lassitude, violent cephalalgia, vertigo, buzzing in the ears, and a pain over the infra-orbital region, which had not disappeared up to the time of his coming under observation. To this was added a facial neuralgia, accompanied by involuntary contractions of the facial muscles of the right side, especially the elevators of the lower jaw, phenomena which became more marked and more aggravated up to the 9th of April, 1855, when he entered the Hôtel Dieu de Lyon.

His symptoms were principally located on the right side of the face, and were as follows: intense infra-orbital pain, buzzing in the ears, amblyopia, diplopia, strabismus convergens, dilatation of the pupils, especially the right, expressionless face, from time to time painful contractions of the muscles of the right half of the face, and twisting of the mouth to this side, embarrassed speech, intelligence and memory apparently intact, decubitus dorsal, general immobility; fixity of look, normal temperature; pulse full, regular, not frequent. There had been some vomiting before entering the hospital. Death occurred a month later. The patient, little by little, fell into stupor and coma, without any new symptoms referable to the extremities being noticed. From time to time he presented symptoms indicating congestion of the brain. The skin of the cheeks and forehead became almost completely anæsthetic, especially on the right side. Calomel, vesicatories, aconite, and bloodletting were the principal measures resorted to, but without benefit.

Autopsy.—Marked redness of the arachnoid and pia mater; infiltration of much reddish serum beneath the meninges on the convexity of the brain. The brain substance rich in blood and firm; membranes at the base opaque, thickened, and covered by a yellowish gelatiniform substance, which also inclosed the commissures of the optic nerves. The lateral ventricles were about three times larger than normal, and were filled with yellowish serum; the fifth ventricle was also dilated, and at the same time filled with serum. The middle (third) ventricle was occupied by a gelatiniform, yellowish, firm mass of the size of a walnut, pressing apart the corpora striata and the thalami, and protruding forward between the corpora mamillaria; and on section showing a red layer, then a blackish layer, presenting, in fact, all the appearances of an old blood clot. The walls of the

third ventricle showed no trace of a laceration. (Bossu, *Gaz. Hebdom.*, tome ii. 1855; and *Canstatt's Jahrb.*, Bd. III. 1856, s. 26; from *Journ. de Méd. de Lyon*, 31 Août, 1855.)

It is a well-known fact that following meningeal hemorrhage cysts may form, and such being the case, remembering the analogy existing between the arachnoid space and the ventricular cavity, why should not the same take place in these latter spaces? Positive facts are wanting, but we know that in not a few cases small cysts are found projecting into the ventricles, which undoubtedly owe their origin to a previous hemorrhage, but whether primarily or secondarily ventricular it is difficult to decide. However, they tend to prove the probability of such an occurrence taking place. The cysts found so often attached to the choroid plexuses are of a different origin, and are in no way related directly to ventricular hemorrhage. Acute inflammation of the lining membrane has certainly in one, and probably in several others, followed the extravasation, and in the few cases in which recovery has taken place, it has been found thickened and vascularized to a marked degree, indicating undoubtedly a chronic inflammatory process. In Bossu's case, a chronic basilar meningitis had occurred, probably by direct continuity of tissue. The following is a well-marked case of acute ventricular inflammation secondary to hemorrhage:—

CASE 28. A female, aged 65. On Aug. 10th, while seated, suddenly seized with vertigo and fell. Incoherence, movements of head painful; mouth deviated; tongue dry; pulse irregular and intermittent; constipation; urine passed involuntarily. 15th. An apoplectic attack with coma and stertor. On the following days delirium, mumbling, no paralysis, intelligence preserved, head turned to the left, crying when attempts were made to replace it. Death on the 22d.

Bones of cranium thin and fragile. Pia mater much injected. Brain somewhat soft, but without laceration. In the lateral ventricles about two ounces of coagulated blood. Septum lucidum torn through. Ventricular walls covered by a grayish substance, dense enough to permit it to be raised in shreds, and studded with vascular ramifications, very apparent and gorged with blood. A small clot in the third ventricle. Pia mater red, and injected over the cerebellum. The right vertebral artery, at the point of union with the left, presents a bony tumour of the size of a hazel-nut, which occludes its lumen. The various arteries at the base are calcareous. (Gintrac, *loc. cit.*, from Raikem, *Répertoire d'Anatomie de Brechet.*, tome i. 1826, p. 123.)

That dropsical effusions within the sac of the arachnoid sometimes follow or owe their origin to former hemorrhages into that cavity has long been recognized, and is admitted by such authorities as Legendre and Ramskill. It was long ago claimed by Rilliet and Barthiez that the same was true of chronic ventricular hydrocephalus. They pointed out the fact that ventricular hemorrhage might result finally in a simple serous accumulation in these spaces, and even quoted a case in support of this. I have been unable myself to find such a case, but remembering the resemblance between those two great serous sacs, the arachnoid and ventricles, in other respects, I can see no reason why such should not be true of the ventricles.

It will, from the foregoing, be seen that the possible changes within the

ventricles following an effusion of blood, differ in no essential respect from those occurring within the brain substance or upon the surface. The blood may remain almost unchanged, may be partially or completely absorbed, may terminate in cystic formation, or any other of the changes known to take place in either meningeal or cerebral hemorrhage proper.

In a certain number of cases multiple effusions exist, that is, with the ventricular extravasation we find sometimes one, sometimes several other points of effusion in the brain substance, as in cases by Jackson and Abercrombie, and in my own patient. In a case by Dr. Cheyne there were three distinct clots, one in the substance of each corpus striatum, and one in the third and fourth ventricles. In my own case, in addition to the ventricular effusion, a clot the size of a large pea was found in the centre of the pons, surrounded on all sides by normal brain substance, and having absolutely no connection with the blood in the ventricles. In some cases, numerous spots of punctate extravasation scattered throughout the brain have occurred. The possibility of the coexistence of meningeal and ventricular hemorrhage has already been referred to, and probably actually did occur in eight cases.

The changes observed in the meninges are various and inconstant. In a number of cases the dura mater was found more or less firmly adherent to the bones. The sinuses were usually filled and distended with blood, generally fluid but sometimes clotted, rarely were they collapsed and empty. The arachnoid was not thickened or opaque, except perhaps in a few cases where death occurred later on. Sometimes flakes of lymph-like deposit were found, probably indicating a meningitis, such cases being among those where the fatal termination was delayed. Serous effusion, either simple or blood-stained, is common, while the existence of blood over the meninges, usually due to escape from the ventricles, has already been repeatedly referred to. The most common condition existing in the meninges is congestion more or less intense, usually general, that is, affecting the entire surface of the brain; but in a few instances it is confined to one part or one side of the brain, thus taking place in those instances where the hemorrhage is small. In quite a number of cases the membranes are absolutely and perfectly normal. As regards the brain itself, this, with the exception of the occasional laceration and the morbid appearances depending upon the pre-existing morbid conditions, presents but few noteworthy changes. When such do occur they consist in a simple congestion, the puncta vasculosa being increased in number, and standing out boldly. Sometimes the brain is anæmic and œdematous, but this seems to be rare. Occasionally, though very infrequently, one side of the brain will be found congested, the other anæmic; this latter affecting the side on which the hemorrhage has occurred, for this condition when present occurs only where the extravasation has remained unilateral. Flattening of the convolutions sometimes exists. In quite a number of cases the brain sub-

stance will be found in a perfectly normal and absolutely unchanged state.

The associated morbid changes in the various organs and viscera of the body are exactly similar to those taking place in the ordinary form of cerebral hemorrhage. We find them the seat of various organic changes, and even affected by ecchymoses or hemorrhages, more especially the lungs;—conditions, since the resemblance is in every respect perfect, which need no recapitulation here.

Diagnosis.—Usually, without the previous existence of premonitory symptoms, while at rest or moving about, generally suddenly, but sometimes with more or less degrees of slowness, the attack shows itself. It may be ushered in by symptoms of apparently slight import, or they may be so violent and overwhelming as to terminate rapidly or perhaps almost instantaneously in death. The mildness or violence of the onset, however, is in no way related, as a rule, to the subsequent course of the disease. Vague symptoms may be followed by death in a few minutes, as, for instance, in a case recorded by Bright; whereas the most violent onset may only terminate fatally after several days, as occurred, for example, in Abercrombie's case. The attack may open with convulsion, or this may be delayed for some hours, convulsion at some time being the rule, soon to be followed by partial or complete coma, paralysis, usually of one-half of the body, contracture, either in the form of trismus or affecting one or all the extremities, suffused eyes, dilated or contracted pupils, congested or pale face, stertorous respiration, slow, full, regular pulse, vomiting,—in fact, that collection of symptoms recognized as indicative of the apoplectic condition. Death usually soon follows, or slight improvement may take place, only to be again followed by recurrence of the symptoms with greater violence and speedy death. Where life is prolonged for some days, the actual signs of the attack may give place to those of brain inflammation, delirium, restlessness, drowsiness, gradually passing into stupor and coma, febrile movement, constipation, etc. Death, however, is not the invariable rule, and in the few cases of recovery, the paralytic symptoms, if such have existed, are more or less permanent, corresponding in this respect with the ordinary form of encephalic hemorrhage. There is no single symptom which can be considered as pathognomonic of primary intra-ventricular hemorrhage. In the present state of our knowledge of the subject, a positive diagnosis in many cases is, of course, impossible. But given a patient with sudden complete coma, partial or complete paralysis, or even without any paralysis at all, contracture and convulsion, with rapidly following death, in fact that collection of symptoms which we have come to recognize under the term “apoplexie foudroyante,” the probabilities are that we are dealing with a primary intra-ventricular extravasation. Yet such a diagnosis is in the highest degree problematic, though, I think, still justifiable, since there is only one condition whose symptoms closely

approximate those of this complaint, meningeal hemorrhage. Nevertheless, there are several other lesions which give rise to very similar symptoms; secondary ventricular extravasation, cerebral hemorrhage, and, perhaps, rupture of an abscess in the ventricles.

Secondary ventricular hemorrhage is most common in the adult, while the primary form, as we have seen, mostly attacks the young and the old. The one is preceded by symptoms referable to a hemorrhage into the brain substance, and a distinct interval can be observed between the symptoms of the brain extravasation and those dependent upon the rupture of the blood into the ventricles, an accident indicated by convulsions, powerlessness, and rapid coma. No such sequence of symptoms is observed in the primary form. Contracture, which by many is considered characteristic of the secondary variety, is certainly not so of the primary. It is rather by a collection and grouping of symptoms than by a single symptom that we shall be enabled to arrive at a conclusion. Even when contracture is present, too much reliance must not be placed on it, since it occurs not infrequently in other forms of intra-cranial disease, especially in the meningeal. Durand-Fardel mentions four cases of extravasation into the brain without rupture into the ventricles in which it was present. Jacoud and Hallopeau speak of it as occurring with hemorrhage into the pons. Popham (*Dublin Quarterly Journ. of Med. Sc.*, Aug. 1862) relates a case of abscess of the corpus rhomboideum of the cerebellum in which muscular rigidity of both lower extremities existed, and quotes another case from Dr. Bright, where there was disease of the rhomboid body. Still, such instances are rare, and according to Durand-Fardel contracture is indicative of escape of blood into the ventricles from a foyer in the brain substance. Therefore, where this symptom ensues, if it has been preceded by symptoms of cerebral hemorrhage, we may exclude a primary ventricular extravasation, and diagnose one of the secondary form.

We may tabulate the principal distinctive points in the differentiation of primary ventricular hemorrhage and the ordinary cerebral form, as follows:—

VENTRICULAR HEMORRHAGE.	CEREBRAL HEMORRHAGE.
Common in the very young and the old.	Most frequent during middle life.
Onset very rapid and violent.	Onset slower and less violent.
Coma usually most profound from the very beginning.	Coma generally not so profound.
Convulsions common.	Convulsions rare.
Contracture frequently present.	Contracture seldom observed.
Paralysis frequently absent, sometimes general.	Paralysis the rule, generally hemiplegic.
Transient improvement or remission of symptoms not uncommon.	Transient improvement far less frequent.
Seldom ends in recovery.	Often ends in recovery.
Death rapid, frequently within a few hours.	When fatal, life is usually prolonged for several days.

As between meningeal and primary ventricular hemorrhage we have the following points of differentiation. Still it will be found a very difficult matter to discriminate between these two conditions, which approach each other in so many respects, especially as regards etiology and symptomatology, yet these few points may nevertheless be deduced in this direction :—

VENTRICULAR HEMORRHAGE.

Such history absent.

Premonitory symptoms not uncommon.

Pain in the head not frequent.

Paralysis when present, as a rule not general, usually hemiplegic.

Deviation of mouth and tongue more common.

Contracture very common.

Convulsions, although frequently present, not so common.

Vomiting not so common.

No such symptoms.

Death rapid.

MENINGEAL HEMORRHAGE.

When occurring in the new-born, a history of a difficult labour; in the adult, a history of an injury.

Such symptoms usually absent.

Pain in the head frequent (Ramskill).

Paralysis commonly general, hemiplegia exceptional (Nothnagel).

Deviation of mouth and tongue of rare occurrence (Ramskill).

Contracture, though frequent, less common.

Convulsions the rule.

Vomiting very common.

Symptoms of secondary meningitis with high fever, about the third or fourth day.

Life is prolonged for several days, as a rule.

A careful examination of the histories of twenty-four cases in which rupture of a cerebral abscess had occurred into the ventricles has convinced me that no great difficulty need be encountered in differentiating between such an accident and ventricular hemorrhage properly so called. One of our best guides is the etiology of the former, since in the majority of cases we will obtain a history of an injury received, or the patient has suffered from chronic otitis media, or is the victim of pyæmia, conditions found but seldom to obtain in ventricular hemorrhage. Besides, the history preceding the attack points in most of the cases to the previous existence of suppuration within the cranial cavity. Headache, usually localized, generally existing for a considerable period of time, is a very prominent symptom of abscess, and not of ventricular hemorrhage; while convulsions, though frequent in the former, are not so common as in the latter. Contracture is rarely observed. Delirium is very common, in fact, it seems to be one of the characteristic symptoms following rupture of an abscess into the ventricles, probably depending upon a secondary inflammation of the ventricular parietes. Another important sign, wherein a marked difference can be observed between these two conditions, is the course of the temperature: that of ventricular hemorrhage, resembling that consecutive to hemorrhage into the brain substance; while that of ruptured abscess is closely allied to that indicative of purulent formations anywhere. This I consider a very trustworthy and reliable differential

point. In ruptured cerebral abscess, death is never so sudden as in ventricular hemorrhage, being almost always delayed for several days.

Taken as a whole, the symptoms produced by the rupture of an abscess into the ventricles seem to resemble more closely those of an ordinary cerebral hemorrhage than of a ventricular extravasation.

Prognosis.—Most authors agree in the statement that extravasation of blood into the ventricles is uniformly and rapidly fatal.

Primary ventricular hemorrhage is almost always fatal. I use the terms “almost always” advisedly, notwithstanding the assertion of Foville that extravasation of blood into the ventricles is *always* fatal; since in several of my collected cases life has been prolonged indefinitely, and in some other cases actual cure must have occurred. The degree of danger and the rapidity with which death ensues vary with the amount, seat, and rapidity of the extravasation.

The danger to life is greatest in cases where the hemorrhage is into the fourth ventricle primarily, such attacks proving fatal in a few minutes. This is not surprising when we remember the important relations of this space to the vital centres in the medulla. As far as I am able to determine, recovery has never followed extravasation into this ventricle. Hemorrhage into the third ventricle is next in degree of fatality. Here death is usually delayed, though following with unusual rapidity when compared with cerebral hemorrhage. Still when compared with that into the fourth ventricle, it may be said to be relatively slow. Recovery may and has taken place, as in Bossu's case, death occurring a year after from an extensive basilar meningitis, chronic in character, dependent upon the previous hemorrhage. The least dangerous form is that taking place into the lateral ventricles. Death, as a rule, follows only after several hours, and not infrequently may be delayed several days. Recovery is relatively frequent, as shown by the numerous recorded cases of fibrous or calcareous masses, the remains of old clots found about the choroid plexuses of these spaces, as also by the two of my collected cases where actual and undoubted hemorrhagic remains were found. In such cases the extravasation has doubtless been small.

Large hemorrhages are generally rapidly fatal, small ones slowly. Thus when general, involving all the ventricles, death quickly ensues; whereas in those cases where it has remained confined to one ventricle, especially if this be one of the lateral, it is somewhat delayed. This rule does not apply to the fourth ventricle, but even here it would seem that a small extravasation may cause death only slowly.

According to Trousseau, apoplexy, in the true meaning of the term, is rare in cerebral hemorrhage; but the contrary seems to hold in intraventricular extravasation; for in at least eight of my collected cases death was almost instantaneous. “Death by intra-cranial hemorrhage is never so exceedingly rapid as it often is from these sources.” With this

last statement I am forced to differ as regards the ventricular form of cerebral hemorrhage, since the fact stands that instantaneous death has been induced by it in not a few cases. As before remarked, death is generally rapid, relatively far more so than in simple cerebral apoplexy, and often it is immediate.

In my 94 cases the time of death is noted in 70. Of these 65.7 per cent. died within twenty-four hours, and of them all but three are reported to have expired in less than twelve hours, thus showing the great rapidity with which this disease proves fatal. Rapid death may, therefore, be said to be the rule, delayed death the exception. The cases of instantaneous or rapid death are those in which the blood has originally been poured out into the fourth ventricle, or has succeeded in reaching it from the other ventricles, usually in cases where the hemorrhage has been excessive. Though this is the rule, there are a few exceptions in which the blood has remained confined to one or both lateral ventricles, yet death rapidly ensued. In those which are less suddenly fatal, the hemorrhage has usually been less abundant or less widely diffused. When death has occurred after the fifth or sixth day it has generally been due to some secondary cause, usually a surface or ventricular meningitis, or perhaps to a recurring hemorrhage, just as in cases of meningeal hemorrhage.

In the three cases in which recovery took place the extravasation occurred into one ventricle only; in two into one lateral ventricle, and in the third case into the middle ventricle only.

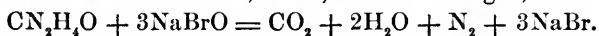
ARTICLE IX.

QUANTITATIVE DETERMINATION OF UREA BY ALKALINE HYPOCHLORITES AND HYPOBROMITES. By THEO. G. WORMLEY, M.D., Professor of Chemistry in the University of Pennsylvania.

THE determination of the amount of urea present in the urine by the volume of nitrogen evolved under its decomposition by sodium hypochlorite, was first proposed by Davy (*Philosoph. Mag.*, 1854, p. 385). According to his observations, the quantity of nitrogen evolved corresponded very closely to the calculated amount present in the urea. But according to the observations of M. Leconte (*Chem. Gaz.*, 1858, 433), with a different form of apparatus, under the action of this reagent only about 92 per cent. of the nitrogen is evolved.

Messrs. Russell and West proposed to substitute for the hypochlorite an alkaline solution of sodium hypobromite, and advised a special form of apparatus for the application of the test (*Jour. Chem. Soc.*, Aug. 1874, and *Am. Jour. Med. Sci.*, April 1875, p. 531). These observers however obtained only about 94 per cent. of the total nitrogen.

Under the action of either of these reagents, as is well known, the urea is resolved into carbon dioxide, water, and free nitrogen, thus:—



Theoretically, therefore, the whole of the nitrogen should be evolved, but it is generally admitted that in practice this is not the case. According to at least one observer, this loss is due to a portion of the nitrogen being retained as a cyanate; whilst according to another it is retained as a nitrate.

To remedy this defect, M. Mehu advised to mix either glucose or cane-sugar with the urine before adding the hypobromite, when the whole of the nitrogen would be set free (*Compt. rend.*, 1879, 175). But, according to M. Esbach (*Ibid.*, 417), and also to M. Jay (*Bull. Soc. Chim.*, 1880, 105), a solution of glucose *alone* evolves some gas under the action of the reagent. Again, M. Fauconnier obtained in the presence of glucose, from a given quantity of urea, the theoretical amount of nitrogen; whilst in the presence of cane-sugar he obtained only 94 per cent. of the total nitrogen (*Ibid.*, 102).

According to my own experiments, when a solution either of cane-sugar or of glucose is mixed, at least in certain proportions, with the hypobromite reagent, without the presence of urea, the temperature of the mixture increases and its yellow colour is gradually discharged, but *no gas is evolved*. When 1 gramme of cane-sugar in 5 c.c. water was added to 10 c.c. of the reagent (prepared as stated hereafter) at 21.1° C. (70° F.), the mixture at the end of twenty-five minutes acquired a temperature of 30° C. (86° F.), after which the temperature slowly fell.

In a similar experiment with glucose, the temperature increased from 21° C. (69.8° F.) to 35.5° C. (96° F.) in ten minutes, which was the maximum reached. It was also observed that the presence of large excess of glucose entirely prevented the decomposition of urea by the hypobromite reagent.

For the purpose of examining the accuracy of this test for urea, without the presence of cane-sugar or glucose, the form of apparatus, at least in principal, advised by R. Apjohn (*Chem. News*, Jan. 1875, 37), was employed. This consists of a wide-mouthed bottle in which is placed the reagent, and also a small test-tube, for containing the urea solution, of about 10 c.c. capacity and of such length as to stand inclined in the bottle. The mouth of the bottle is closed with a rubber stopper carrying a glass tube, by which it is connected by rubber tubing to a graduated burette divided into $\frac{1}{10}$ c.c. and suspended in a long cylinder of water from an adjustable arm.

The urea solution is placed in the small tube within the charged bottle, the apparatus closed, and when there is no longer any change in the height of the column of liquid within the graduated tube, this is so adjusted that the surface of the contained liquid exactly coincides with that in the cylinder. This point, the temperature, and in exact experiments the

barometric pressure being noted, the urea solution is mixed with the reagent by inclining the bottle and gently shaking the mixture. As the evolved nitrogen collects in the graduated tube, the latter is gradually raised to relieve the contained gas from the increased pressure. When the evolution of gas has entirely ceased and there is no longer any change in the volume of gas, the tube is finally adjusted and the exact volume noted. The reagent employed was prepared, as first advised by Messrs. Russell and West, by dissolving 100 grains caustic soda in 250 c. c. water, and adding to the cooled mixture 25 c. c. bromine. In applying the reagent it was diluted with a volume and a half of pure water.

With this arrangement a series of experiments was performed employing 1 c. c. of a standard solution of pure urea varying in strength from one to six per cent., variously diluted, and added to varying quantities of the reagent. These experiments gave different results, in some only about 90 per cent., and even less, of the nitrogen being evolved, while in others a larger proportion was obtained, and in still others the *whole* of the nitrogen was set free. It was finally observed that under certain conditions the whole of the nitrogen is uniformly eliminated. These conditions are:—

1. The reagent should be freshly prepared.
2. The urea solution should be wholly added to the reagent, none of the latter being allowed to mix with the urea solution in the containing tube.
3. The amount of urea operated upon should not exceed one part to about twelve hundred parts of the diluted reagent.

Moreover, the diluted urea solution should be added in small portions at a time to the reagent, thoroughly mixed, and the effervescence allowed to cease before any further addition of urea. So, also, it would appear, at least when comparatively large quantities of urea are present, that the surrounding temperature should not be less than about 20° C. (68° F.).

In the practical application of the test, if a two per cent. solution of urea is under examination, 1 c. c. of the solution, diluted with from 5 to 10 c. c. water, is placed in the containing tube, and the mixing bottle charged with 10 c. c. of the reagent diluted with 15 c. c. water; whereas, for 1 c. c. of a four per cent. solution of urea, similarly diluted, not less than about 50 c. c. of the diluted reagent should be employed.

In a final series of experiments, in which the above conditions were observed, the temperature being noted to $\frac{1}{10}$ degree, and the results reduced to the standard temperature (0° C.) and barometric pressure (760 mm.), the following average results were obtained:—

Urea employed.	Nitrogen evolved =
10 milligrammes,	9.98 mgrm. urea.
20 “	20.07 “
30 “	29.95 “
40 “	39.88 “

In these experiments it was assumed that 1 gramme of urea contains 372 c. c. nitrogen, measured at 0° C. and 760 mm. barometric pressure; or, that each c. c. of nitrogen evolved, measured under the conditions stated, represented .002688 gramme urea.

During these investigations it was observed, in cases in which the whole of the nitrogen was not evolved, that so long as the conditions remained the same, the relative proportion of the nitrogen eliminated was pretty uniform. Hence, if the volume of nitrogen evolved from a known quantity of urea under certain conditions, or by a given form of apparatus, be determined, the result may be taken as the basis for the determination of the urea in the urine with sufficient accuracy for clinical purposes.

ARTICLE X.

ANÆSTHESIA OF THE CORNEA AND ITS SIGNIFICANCE IN CERTAIN FORMS OF EYE DISEASE By JAS. L. MINOR, M.D., Assistant Surgeon to the New York Eye and Ear Infirmary.

For several years past, Dr. Noyes has been in the habit of testing the sensation of the cornea in many diseases of the eye, and the following cases, occurring in his practice, will serve to illustrate a class in which anæsthesia was found. Such cases are by no means infrequent—all ophthalmologists are familiar with them; but, taken singly, as they usually occur, one is apt to be struck only with their obstinate character, whereas, collectively, a group of symptoms is presented, which clearly places them in a class peculiar to themselves—and thus by calling attention to their existence, it is hoped that closer observation will lead to a better understanding concerning them. Brief histories of the cases will be given, after which the peculiar features will be pointed out, and the deductions to be drawn therefrom presented. The test of the degree of corneal sensibility was to touch the surface with a pledget of cotton rolled to a point, or with a fine brush, and comparison was always made with the other eye. In all cases quoted there was decided difference in the tolerance of the two eyes. The diseased one might be conscious of being touched, but its sense of feeling was manifestly blunted.

CASE I.—A male, 35 years old, robust and healthy, has suffered for several months with a cold in his left eye, which has resisted all treatment. Pain has been present, frequently severe, usually in the eye, but occasionally in the supra-orbital region, and twice involving the whole left side of the face. Present condition, conjunctivitis;¹ maceration of the epithe-

¹ The term conjunctivitis, as used with these cases, is not strictly correct. The condition is one of vascular paralysis, distinct from, but associated with inflammation.

lial layer of the cornea, with small facets at its periphery; anæsthesia of both the cornea and conjunctiva. Amongst the remedies used may be mentioned the various astringents, atropia, cold applications, hot fomentations, corneal paracenteses, protective bandage, hypodermic injections of pilocarpine, Turkish baths, quinia, arsenic, etc. After remaining under treatment for four weeks, the patient passed from observation with very little improvement in his condition. The patient had a carious and painful left molar, the removal of which did not influence the eye disease.

CASE II.—A female, 27 years old, has been subject to colds in the eye for the past year. The present attack commenced several weeks ago, and for the last two days pain in and around the eye has been distressing. Present condition, conjunctivitis; keratitis; and extensive erosion of the epithelial layer of the cornea; anæsthesia of the cornea; tension of globe reduced; no iritis, but a contracted pupil, which responds imperfectly to atropia. She was treated for a period of nearly five weeks, both locally and generally, with but moderate improvement. The epithelial layer of the cornea has been regenerated. The sensation is still diminished, but not so markedly as when first seen.

CASE III.—A robust and healthy man, 60 years of age, has had a cold in the right eye for nearly three weeks, and for the last few days severe pain in the right side of the face and head. Present condition, conjunctivitis; erosion of the corneal epithelium at its inner margin; anæsthesia of the cornea and conjunctiva; no iritis, but a contracted and sluggish pupil; tension of the globe reduced. There is partial anæsthesia of the parts supplied by the right fifth nerve. Local treatment proved rather irritating than otherwise, and general remedies were unsatisfactory, until, at the expiration of three weeks' treatment, the fluid extract of gelsemium was administered. Under its influence the pain disappeared, the inflammation subsided, and sensation returned. Morphia in large doses had failed to relieve the distressing pain. The pain, though nearly always present, was much exaggerated between the hours of two and five A.M., which led to a suspicion of malaria. Quinia did not relieve.

CASE IV.—A male, 48 years old, had two months ago an attack of right facial neuralgia, with swelling of that side of the face. As this condition subsided (in five or six days), the right eye became inflamed, which inflammation, soon passing away, left the sight impaired. Several relapses were experienced. Present condition, conjunctivitis; keratitis; anæsthesia of the cornea and conjunctiva; sensation of the right side of the face diminished. The treatment was both local and general. The course was tedious and prolonged. This patient had seven carious tooth-roots, the removal of which did not influence the disease.

CASE V.—A male, aged 57, brings a note from his family physician stating that he has recently suffered from an attack of facial erysipelas, limited to the left side of the face. The left eye was slightly inflamed before the erysipelas was experienced, and became much worse during its existence. The erysipelas (which was really an attack of herpes zoster ophthalmicus) has subsided, leaving the eye inflamed and painful, with neuralgia of the adjacent nerves. Present condition, conjunctivitis; slight keratitis; anæsthesia of the cornea and conjunctiva; a small and sluggish pupil (non-inflammatory); the globe reduced in tension; dimin-

The sodden appearance, with enlarged and tortuous vessels coursing along the conjunctival surface, presents a characteristic condition, and is quite different from the velvety swelling seen in pure conjunctivitis.

ished sensation, with a feeling of numbness in the parts supplied by the left fifth nerve. On the left side of the nose and forehead herpetic scars, some of which have not entirely healed, are observed. Recovery slow; local treatment unsatisfactory. Quinia was apparently beneficial; fluid extract of gelsemium relieved the pain, and under its influence sensation slowly returned, and the inflammatory symptoms subsided.

CASE VI.—A male, aged 25, suffering from conjunctivitis and anæsthesia of the cornea, received local treatment for four days without benefit, when it was found that he suffered from supra-orbital neuralgia, with tenderness of that nerve, and furnished a history of malarial poisoning. He was immediately placed on large doses of quinia, and reported himself in two days as about cured; sensation in the cornea having returned.

CASE VII.—A male, 30 years old, has ulcerative keratitis, an anæsthetic cornea, with neuralgia and tenderness of the supra-orbital nerve, and a history of malarial poisoning. The treatment was paracentesis of the cornea, atropia, boracic acid solution, protective bandage, and large doses of quinia. Two days later he was much better, and on the fifth day after he was first seen he was allowed to return home about cured; the cornea having regained its sensibility.

CASE VIII.—A male, aged 47, has conjunctivitis in the left eye, with minute corneal opacities, anæsthesia of the cornea, supra-orbital neuralgia and tenderness, with a malarial history. The ordinary local treatment was adopted, and large doses of quinia administered. The patient was not again seen for several weeks, when he voluntarily stated that improvement commenced as soon as "buzzing in the ears" was noticed. The cornea is sensitive; the conjunctivitis has nearly disappeared, and no trouble exists with the supra-orbital nerve.

CASE IX.—A male, aged 28, has conjunctivitis of a week's standing; the conjunctiva and cornea are both anæsthetic. The pupil is small and sluggish (non-inflammatory). There is neuralgia and tenderness of the supra-orbital nerve. Improvement commenced and continued under the influence of quinia, and simple local remedies.

CASE X.—A male, aged 35, has been subject to attacks of sore eyes for the past nine years. The first occurred in 1871, the second in 1876, the third in 1879, the last and final one in 1880. This attack commenced a week before he was seen, and was preceded by a well-marked chill. Severe facial neuralgia on the same side remained after the chill passed off, and was present when seen, as also was tenderness of the supra- and infra-orbital branches of the fifth nerve. The conjunctiva was inflamed; the cornea nebulous from previous inflammation, and anæsthetic. Pupil small and sluggish, but iris not inflamed. Local treatment was adopted, and quinia administered. He was seen four days later, and was then found to be much better. Unfortunately he was not seen again.

I think that we are justified in placing these cases in the category of neuro-paralytic affections, and in locating the lesion upon which they depend frequently in the Gasserian ganglion. The lesion may be more or less circumscribed, involving fibres of the sensitive, vaso-motor, and trophic varieties, whose destination is the eye; or, it may invade a more extensive territory, viz., an entire branch of the trifacial, or the trunk itself.

Anæsthesia of the cornea existed in every case. It was found in the

conjunctiva in five cases; and partial anæsthesia of the corresponding fifth nerve presented itself in three cases.

Anæsthesia of the cornea was only one factor, and did not in these cases bear any special relation to either the severity of the attack, or the inflammation which frequently existed in this structure. Anæsthesia of the cornea existed in six cases without keratitis; and in those cases that presented both anæsthesia and inflammation, complete protection of the eye did not materially alter the course of the disease. It may be mentioned that two classes of corneal anæsthesia have been excluded. First, those in which the anæsthesia is dependent upon inflammatory swelling of the conjunctival and corneal tissues, whereby the nerve-fibres are compressed, and their functions impaired or destroyed; second, the well-marked cases of neuro-paralytic ophthalmia which accompany complete paralysis of the fifth, and in which the corneal anæsthesia is complete, and is associated with central trophic lesions.

Vaso-motor disturbance was shown by paralysis of the bloodvessels of the conjunctiva and iris. Dilatation of the vessels of the iris is sufficient to maintain an obstinately contracted pupil, and to enable the iris to withstand remarkably the influence of atropia employed in full doses: and that too when no pupillary adhesions or exudations existed.

Trophic changes manifested themselves through a disturbance in the nutrition of certain structures of the eye (conjunctivitis, infiltration, inflammation, and ulceration of the cornea, etc.), due to central nervous lesions.

Diminished tension of the globe was noted in three cases. It is not stated as having been increased in any—and was probably more frequently present. This reduction may have been due to either mechanical or neurotic influences. The character of the neuralgia indicated both its connection with the eye trouble and its central origin.

In locating the primary lesion in the Gasserian ganglion, pathological deductions are drawn from physiological experiments.

“The Gasserian ganglion forms a flattened crescentic mass of gray matter mingled with the fibres derived from the sensitive root (of the fifth). According to Kölliker the fibres of the sensitive root simply pass through the gray matter of the ganglion, making no anatomical connections with its nerve cells, while the ganglion cells, which are unipolar in form, give off fibres in a peripheral direction. Thus the branches of the fifth nerve beyond the ganglion contain, besides the fibres of the sensitive root, others, which have their origin from the ganglion itself. . . . If the fifth nerve be divided within the cranium by a section passing in front of or through the Gasserian ganglion, a change of nutrition often follows in the cornea, by which its tissue becomes the seat of vascular congestion and ulceration . . . immediately after the operation, the pupil is contracted, and the conjunctiva loses its sensibility. . . . Although these consequences usually follow division of the fifth nerve when performed at the seat of the Gasserian ganglion, or between it and the eyeball, they are either retarded in their appearance or altogether wanting when the section is made posterior to the ganglion, between it and the base of the brain.” (Dalton.)

It is a fact that the fifth nerve does receive sympathetic fibres, before and after its passage through the Gasserian ganglion, and that implication of these fibres and of the ophthalmic ganglion may induce nutritive and other changes in the eye. Under such circumstances, however, the manifestations will be more restricted and less constant than those dependent upon lesions in the Gasserian ganglion, and such as were presented by some of the above related cases.

It is interesting to observe the similarity which exists in all of these cases. Case V. was a typical one of herpes ophthalmicus. Case IV. was probably the same disease. The intimate pathological relation between all of these cases is forcibly suggested. Another interesting fact is that the last five cases presented supra-orbital neuralgia, with tenderness of this nerve, and histories of malarial poisoning. These cases were cured of all of their maladies by the energetic use of quinia. Cases I. and IV. had carious teeth, the removal of which did not benefit the condition of the eyes.

In regard to the *diagnosis*, the symptoms presented are sufficiently distinctive. The only point that it is important to observe is the etiological relation that malaria bears to many cases. With neuralgia and tenderness of the supra-orbital or other branches of the fifth pair, and a malarial history, we are justified in diagnosing "malarial" conjunctivitis, or keratitis.

The *prognosis* is rather conjectural than otherwise in these cases not malarial. The duration may be roughly stated as from two to six weeks, and relapses are to be anticipated. If malarial, the prognosis is favourable, and a cure may be effected in a few days.

Local treatment proves of little benefit. Hot fomentations are usually pleasant and grateful to the patient. Weak astringents, or boracic acid, are sometimes well borne. Keratitis or iritis would, of course, call for atropia. The iris, however, manifests little reaction to atropia, whether inflamed or not. Paracentesis of the cornea does not seem beneficial; a protective and pressure bandage is indicated if ulceration is present, otherwise it is not important. Of anodynes, which are invariably called for, gelsemium is certainly the best; and following the views of Dr. Prout, of Brooklyn, I prefer to combine it with morphia, with an idea of lessening the dose, and producing a more beneficial effect than either given separately would produce. In malarial cases quinia should be freely administered until cinchonism is produced. In a case not related here in which suppurative keratitis was accompanied with severe pain, both in the eye and distribution of the supra-orbital nerve, twenty grains of quinia three times a day relieved the pain and caused a subsidence of the inflammation. If improvement does not ensue after using it for three days, it will be unnecessary to pursue that treatment longer. Among the remedies which

might have been used in the less successful cases is the constant current of electricity.

Gelsemium is not a new remedy in ophthalmic practice. The late Dr. Hildreth, of Chicago, himself a victim to a fatal overdose of the drug, employed it extensively in his eye practice. Galezowski, of Paris, now advises its use, and has found it a valuable addition to ophthalmic medicine. The beneficial action of gelsemium in affections of the fifth nerve is a well-attested fact, and this action will account for the improvement which followed its administration in these cases. The best form is the fluid extract, and this should be a reliable preparation (Squibb's). The dose should be sufficient to produce and maintain its physiological effect to a very moderate degree. Commencing with five drops every two or three hours, the dose may be continually increased as the system becomes less susceptible to its influence; a sixteenth or an eighth of a grain of morphia much enhances its action. It is well to remember that the drug should be given with care, and its effects assiduously watched; a cumulative effect is sometimes observed, when alarming symptoms supervene upon the use of small doses which have been kept up for a considerable time. Were it not that malaria has heretofore been charged with producing just such affections as have been related, one might have some reluctance in bringing forward that agent for renewed etiological honours; and in referring the primary lesion, in these cases, to a neurotic disturbance, we but follow the views adopted by previous observers.

ARTICLE XI.

RETENTION OF THE MENSES, CAUSED BY IMPERFORATE HYMEN. REPORT OF TWO CASES WITH SOME REMARKS. By LOUIS W. ATLEE, of Philadelphia.

MARY P., sixteen years of age, tall and thin, but with no appearance of ill-health, was brought by her mother to my father's office May 17, 1881. She resided in a healthy place near the city, and worked in a woollen mill, which she said was well ventilated and not dusty.

She urgently demanded relief from unbearable pains in the lower part of the belly, attended by frequent inclination to pass water, which at times was very difficult to accomplish, and an almost constant desire to empty the lower bowel, in fact she had to be shown the privy almost as soon as she entered the office. This condition of things had begun some months before; it was getting worse, and every few weeks for a period of four or five days it was aggravated very much. When asked, her mother said her daughter had never had any show of monthly sickness, or sign of bloody discharge.

This case of amenorrhœa was attended by symptoms so special as to call for a direct examination of the genital organs in order to find out if some

malformation did not exist that prevented the menstrual excretion. There was regular periodical monthly return of expulsive pain in a girl about the age of puberty, and with other symptoms of that period of life.

When attempt was made to pass the finger between the labia it was found to be impossible. It felt as if a very tense cyst with a thick wall blocked up the vaginal canal. The finger passed into the rectum, the gut was found to be pressed back very firmly by an elastic mass, that felt like a thick bladder filled to its utmost limits by a dense fluid. Ocular examination showed that no vaginal orifice existed; and a smooth red membrane existed there, that shut it up. This projected forwards, so that it might be likened to a knuckle between two fingers. A catheter was introduced into the meatus urinarius, which was seen just over the upper part of this red projection; a small teaspoonful of urine came away.

An exploring needle (Charrière's) was now thrust into this bulging mass, but nothing came. A trocar, one used habitually for hydrocele, was then introduced, and slowly a thick dark red liquid began to ooze from the end of the canula. After about four ounces had come slowly away, the instrument was removed, a large diaper was applied by the mother, and the patient left to walk some two squares to return home in the cars. She returned at the end of a week to report herself as perfectly well.

I have written to my grandfather, Dr. John L. Atlee, of Lancaster, asking him if, in his experience of sixty years, he has met with any such case as this one. I extract from his answer as follows:—

“Some years ago, a young girl, about 15 years of age, was brought to me, who never passed her menses, and suffered at each period. Upon examination I found, as you described, the pelvis full and the membrane tense. I made a small opening first to confirm the diagnosis; a fluid like molasses was discharged. I then made a crucial incision, laying open the ostium vaginæ freely, and nearly a quart of a similar fluid was discharged. After cleansing the parts I sent her home; and suppose it was all right, as I never saw her afterwards.

“Another very interesting case of imperforate hymen¹ occurred to me many years ago in the early part of my practice. I was sent for to a primipara, whose husband kept the gate at Witmer's Bridge. When I arrived in the evening she had been in pain all day. Examination *per vaginam* revealed a very strong membrane, occluding the vagina, of quite a fleshy character. I traced it all around and could find no entrance for the point of my finger. In the absence of pain, I could feel a tumour an inch higher up, that felt like the mouth of the uterus stretched over the head of the child. I tried to break the fleshy membrane, but it was impossible. I came home, got my instruments, and made a crucial incision through the membrane, assisted by an old lady who held the candle. As soon as I had done this, I felt the os tincæ and the membranes and head presenting, I ruptured them, and in a reasonable time delivered the patient. She had many children afterwards. The question arose, how could impregnation take place, according to the acknowledged law of impregnation? I could not pass even a probe through any opening into the vagina in this case after searching closely just behind the orifice of the urethra.”

¹ This case, of course, is not reported as one of retention of the menses from imperforate hymen, but it is certainly worthy of record, and I cannot refrain from including it here.

These two cases appear to be worthy of record, and of being commented upon, from the fact that quite extensive research has shown that with the exception of Barnes's *Med. and Surg. Diseases of Women* (London, 1873), and of Emmet's *Gynæcology*, all our systematic treatises in the English language on Surgery and on the Diseases of Women, either altogether ignore this affection, or else very imperfectly appreciate and describe it. Again, as Morgagni puts it, *non numerandæ sed perpendendæ sunt observationes*. It is evident, moreover, that such cases as these are very rarely met with, for my father's experience is one of over thirty years, and that of my grandfather of over sixty, so that both together they represent the experience of a century of active practice. Nélaton (*Pathologie Chirurgicale*) speaks as if he had never encountered this state of things but once.

The anatomical changes brought about in the parts, in these cases of retention of the menses from imperforate hymen, are these. The blood coming down from the uterus is completely arrested in the vagina, which becomes distended, forming an enormous tumour on top of which the uterus is pushed upwards and a little to the right of the median line. The uterus, on account of the great resistance that it offers, does not become distended until very late; when this occurs the blood will be forced into the Fallopian tubes, distending them also.

In these cases, if let alone and the hymen does not give way, the uterus or Fallopian tubes must yield from over-distension or from gangrene. Instant death has followed rupture of the uterus (Courty, *Maladies de l'Utérus*), and fatal peritonitis, rupture of the Fallopian tubes.

The symptoms that accompany the filling up of the parts are these: The patient first complains of colic in the hypogastric region, with a sensation of weight and uneasiness; this lasts for five or six days, and then is absent for a month, until the recurrence of the monthly sickness, when these symptoms return with greater intensity. After this has continued for some time (depending upon the amount of blood exuded), the pains acquire the character of the bearing down pains of parturition. With these symptoms we have the gradual formation of a tumour in the hypogastric region, with tingling and numbness of the extremities from pressure on the sacro-lumbar nerves; there is also difficulty of defecation, with a tiresome tenesmus in the rectum; the bladder is pressed on, and we have not only vesical tenesmus, but dysuria or even retention of the urine. Then follow the sympathetic disturbances of the digestive functions, loss of appetite, and vomiting. The calm which the patient enjoyed in the intervals of the menstrual sickness becomes shorter, and the health is profoundly altered, so that her life is now only a series of sufferings, intermingled with periodic exacerbations.

When a young girl with such a history of symptoms, and with all the outward appearance of the age of puberty, presents herself, a thorough

physical examination of all the genital parts is absolutely necessary. In the vagina, a reddish or violet-coloured projecting tumour will be found, and if the tumour is very tense, the labia minora are effaced. On digital examination of the rectum, its anterior and posterior walls will be found pressed together by a tumour in front. In some cases, those of long standing, in the hypogastric region will be found a tumour, giving a dull flat sound on percussion. Notwithstanding the comparative ease in these cases of making a correct diagnosis, various mistakes have been made; the tumour in the vagina has been thought to be a fallen womb, or the bag of waters, and the hypogastric swelling has been mistaken for pregnancy and ascites (Courty). The prognosis will be the more favourable the earlier the case is seen; when the Fallopian tubes are much distended and tumours can be felt in their position, the prognosis is so unfavourable that some authors have advised that the case be left alone, as death will surely follow (Dupuytren, Boyer, and Cazeaux).

The treatment immediately indicated is the removal of the obstacle to the flow of the blood. As to when and how this is to be performed with the greatest safety to the patient, Bernutz and Goupil (*Clinique Médicale sur les Maladies des Femmes*) advise waiting till eight or ten days after the menstrual period, when the parts will be in the most quiescent state, and then to puncture the hymen with a hydrocele trocar, with a piece of gut attached, for the purpose of avoiding a too sudden emptying of the uterine cavity. When the uterus is emptied too quickly, the Fallopian tubes are apt to contract simultaneously; for this reason a catheter should not be used to insure the escape of the blood. If the blood stops, more punctures can be made; when the greater part of the retained blood has come away, a free incision is made in the obtruding membrane, and means are used to dilate and insure the final permeability of the canal.

Emmet relieved the four cases he has met with by dividing the hymen with a bistoury, and the washing out the vagina and uterus with warm water. A small glass vaginal plug was then introduced and removed twice a day in order to wash out the vagina.

Barnes mentions that death has followed from small as well as from larger incisions of the hymen, and advises that an opening be made sufficiently large to allow of free evacuation, and to prevent the entry of air a compress should be applied over the uterus, and sustained by moderate pressure with a bandage; if any decomposition should arise, the gentle injection of a weak solution of the permanganate of potash or carbolic acid will be desirable.

Courty advises that the operation be performed at the same time as Bernutz and Goupil, eight to ten days after the menstrual period. The hymen is made to bulge out by pressure on the hypogastrium, it should then be seized with a pair of forceps, and a circular piece cut out with a bistoury, or a pair of curved scissors. The pressure on the hypogastrium

must then be stopped, and a thorough examination made of the genital organs with the index finger, and afterwards a medium-sized gum-elastic sound, large enough to fill up the opening, is put in. In this way the blood is kept from spurting fast, and the uterus and vagina from returning to their former condition. The air reaches the uterine cavity with difficulty, and influences it in the least unfavourable manner.

Nélaton (*Pathologie Chirurgicale*) recommends incising the membrane with a bistoury, trocar, or a lithotome, and the introduction of a canula or a tent, to prevent the closing of the opening thus made.

ARTICLE XII.

DISTAL COMPRESSION APPLIED IN A CASE OF INGUINAL ANEURISM, WITH A SUCCESSFUL RESULT. By THEODORE R. VARICK, M.D., Medical Director of, and Surgeon to, St. Francis Hospital, and Surgeon to Jersey City Charity Hospital, Jersey City, New Jersey.

C. T. L., æt. 45 years, a native of Germany, consulted me in April 1877, in reference to an aneurism involving the right popliteal artery of about the size of a small hen's egg. Being unwilling at the time to submit to the prescribed treatment, he sought other advice, and was subjected to a variety of treatment by various persons. After the lapse of one month, he returned, and during that period the aneurism had grown so as to fill completely the popliteal space. Genuflexion, compression by means of shot-bag and tourniquet were successively tried, but, owing to the irritability of the patient, who could not be persuaded to undergo the temporary inconvenience incident to the treatment, failed. On the 21st of May, 1877, I ligated the femoral artery, which resulted in a cure of the disease.

In May, 1880, he noticed a pulsating tumour in the left groin, extending from Poupart's ligament, to as near as could be ascertained about three inches above, thus involving the external iliac artery. The femoral was found to pulsate with preternatural force, and its lumen manifestly dilated. Immediately above Poupart's ligament the tumour expanded abruptly to the size of a billiard ball. The expansile pulsation and thrill indicated its aneurismal character. The patient suffered from primary syphilis twenty years ago, and since that time from osteocopic pains indicating constitutional contamination.

In view of the evidence (presumptive at least) of disease of the whole arterial system, the proper course of treatment was for a time a matter of some doubt. Considering the extent of the disease and the probable necessity of ligating the common iliac, with the chances of finding unsound arterial tunics, I determined to resort to distal compression applied to the artery as it passes over the horizontal ramus of the pubis. I accordingly, on June 27, 1880, applied Ricord's bubo compressor sufficiently tight to moderate, but not entirely obstruct the flow of blood through the artery beyond. Compression was continued forty-eight hours, when the integument becoming inflamed, the compressor was removed. The

pulsation in the mean time having become manifestly diminished, indicating that the process of deposition of laminated fibrin was taking place. The inflammation alluded to went on to the production of a slough the size of a fifty-cent piece, which was ultimately thrown off, leaving a healthy granulating surface which rapidly healed. The patient was confined to his bed sixty-two days. At the expiration of this period, the tumour had become firm, with a scarcely appreciable amount of pulsation, while in the artery beyond none was perceptible.

I saw nothing of the patient until March 15, 1881, when he called at my office. The most careful examination failed to discover the slightest pulsation. The sac had become solid and materially reduced in size. He stated to me that there had been no pulsation for a month prior to this visit. Before placing him in bed I directed a smart mercurial purge, which had the effect to thoroughly cleanse the alimentary canal. There was prescribed a diet consisting of rare beef and mutton, with a pint of milk per diem, and a wineglass of water with each meal. This allowance of water was continued for six days, which was as long as the patient could be persuaded to continue it. Absolute rest was enjoined, with opium at night sufficient to produce sleep. In addition potass. iodid., in doses of grs. xxx. ter in die was prescribed, and its administration continued up to the latter part of November, 1880. Although at the time he was allowed to get out of his bed, and attend to his business, the pulsation had not absolutely ceased, there was at no time an increase of it, and its subsidence was progressive.

The idea of applying compression to the artery beyond the sac originated with Vernet, a French military surgeon, at the close of the last century, and was tried in a single case which terminated unsuccessfully. There seems to have been no subsequent trials of the method, and, from the period alluded to, it received no countenance on the part of surgeons.

Gross in his "System of Surgery," vol. i. p. 730, remarks, "From the want of success attending the case, ill adapted as it was to test the principles of a new process, no one, it seems, felt afterwards disposed to make further trials of it, and it was accordingly forgotten, or remembered only as an ingenious suggestion."

In Holmes's "Surgery," vol. iii. p. 496, we find the following: "As to pressure on the distal side of the sac, it appears in some cases to be very useful as an auxiliary to complete compression of the artery leading to the aneurism; but as the essential measure for the cure of the disease, it is not to be trusted. Still, trial may be made of this plan in aneurism at the root of the neck, where direct pressure might be dangerous, and where pressure between the heart and tumour would be impossible."

It is a source of gratification at this late day to rescue from oblivion a mode of treatment condemned at its inception on account of want of success in a single case.

Although this is the sole recorded case of success, it demonstrates that success is possible, aided by treatment based upon an enlightened pathology, and a recognition of the method adopted by nature, viz., the deposition of laminated fibrin in effecting a cure.

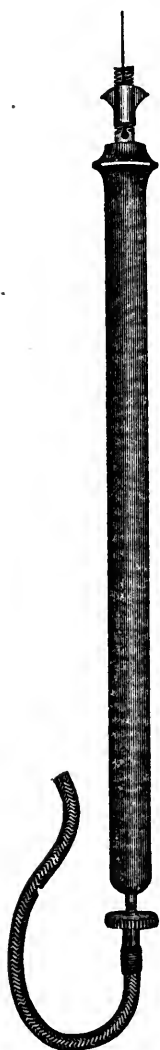
ARTICLE XIII.

AN INSTRUMENT FOR THE REMOVAL OF SUPERFLUOUS HAIRS. By LOUIS A. DUHRING, M.D., Professor of Skin Diseases in the Hospital of the University of Pennsylvania, Philadelphia.

A SUITABLE instrument for the removal of superfluous hairs by means of the galvanic current, according to the method now generally practised by dermatologists in this country, has, I have every reason to think, been a want. I am not familiar with any published account of such an instrument. It has been the practice, doubtless, for each dermatologist to devise for his own use the best contrivance his ingenuity might suggest. The object is of course plain—namely, the introduction of the current to the base of the hair by means of a needle-holder and needle. The several little instruments I have up to the present time used have been extremely simple in their construction, and while serving their purpose were not such as I felt disposed to recommend to inquiring friends. It was with the view of perfecting the instrument that I consulted with Mr. Otto Flemming, the well-known electrical-instrument maker of this city, with the result which I herewith offer to the profession. It meets the purpose for which it was designed, and is, I think, a decided improvement on any contrivance of the kind that I have seen.

It is of the shape of a thin lead-pencil or pen-holder, and is about four inches in length. The handle or stem is of hard rubber, through which passes a metallic rod, acting as a conductor for the transmission of the current. The needle is inserted into the needle-holder proper, which is slotted, the needle being clamped immovably by means of a screw-nut. On the other end of the stem there is an insulated inserting-pin attached to the cord leading to the battery. The instrument is of proper weight, convenient to handle, and altogether well adapted for this neat and most valuable little operation.

A word may be added concerning the needle, which should be of steel and as fine as possible. As stated in the account of the mode of performing the operation, in the second edition of my "Treatise on Diseases of the Skin," a No. 12 cambric sewing-needle ground down to the finest possible calibre will be found the most service-



able. Those I have been using were made (through the kindness of Dr. J. W. White) at the dental establishment of S. S. White, of this city, and have always proved satisfactory.

ARTICLE XIV.

OPERATION FOR THE RELIEF OF BURSAL SWELLING OF THE WRIST. By
J. E. COPELAND, M.D., of Rectortown, Fauquier Co., Virginia.

My object in this article is to invite attention to an operation for the relief of bursal swelling of the wrist, performed more than a third of a century ago by Mr. James Syme, which, perhaps, has not commanded the consideration which it merits, since it is not even alluded to in any of the works on surgery that I have examined.

The American Journal of the Medical Sciences for January, 1845, page 225, presents from the *London and Edinburgh Monthly Journal of Medical Science* for October, 1844, a report of the operation performed by Mr. Syme, in which he says: "There are few subjects of surgical practice that have occasioned more trouble and disappointment than morbid distension of the bursæ which accompany the flexor tendons of the forearm in their course under the annular ligament of the wrist towards the fingers." He refers to the usual treatment of this form of ganglion and its failure, and as the treatment of similar derangements in other parts of the body, is not attended with such negative results, the question, "What local peculiarity is concerned in causing the obstinacy of this particular case?" presents itself to Mr. Syme. He concludes "that the constriction caused by the annular ligament causes the effect in question, by preventing a portion of the bursal sac corresponding to the subjacent tendons from undergoing the healing process," and gives the following case in support of his conclusion:—

"Janet Preston, aged twenty, was admitted on the 13th of February, complaining of pain and weakness in her left hand. The wrist and palm of the hand were much swelled, but not discoloured, and pressure on the parts caused distinct fluctuation, with the jarring sensation that characterizes effusion into the bursal sheaths. She stated that pain had been first felt about two years before, and that for the last twelve months she had had hardly any use of the hand, in consequence of the swelling and weakness attending it.

"I made a free incision from the wrist into the palm of the hand, dividing the annular ligament. This gave vent to a quantity of glairy fluid, with many small flat cartilaginous-looking bodies, and exposed to view the flexor tendons, separated and surrounded by thickened bursal membrane. The cavity was filled with dry lint, supported by a bandage moderately compressing the hand and wrist. In the subsequent treatment care was taken to prevent protrusion of the tendons, by drawing the edges of the wound together, and applying a compress over the seat of the annular ligament. Not the slightest disagreeable symptom followed the operation, and three days after it the patient could sew, which she

had been prevented from doing for many months previously. In the course of a few weeks the wound healed, and the limb was in every respect perfectly sound."

I offer the following case of seventeen years' duration, in which I performed Mr. Syme's operation with a much better result than I had reason to anticipate, considering the long standing of the affection, and the extent and variety of treatment and attention which had been bestowed upon it.

CASE.—George Payne, a well-developed negro, æt. about 39, applied to me March 9, 1879, for "liniment" for the relief of pain in his wrist, forearm, and shoulder, caused by bursal swelling of the posterior portion of the wrist. He gives the following history: During the year 1861 he was engaged in making horseshoes and shoeing horses for the army. In the latter part of the same year he was compelled to abandon his occupation on account of severe pain over the trapezium near the base of the metacarpal bone of the thumb. The pain was increased by the use of the hand, and followed by weakness of the thumb. During the next six months the pain extended towards the ulnar side of the wrist, followed by weakness of the index and middle fingers, and swelling of the wrist, and by the close of the year 1862 the whole dorsum of the wrist was involved, rendering the hand almost useless. When he applied to me he could not support a pound weight on his hand nor close his fingers on an ordinary-sized broomstick, and could not approximate his thumb and index finger sufficiently to enable him to pick up a lead-pencil with them. The pain in his wrist, forearm, and shoulder was almost constant, with exacerbations at night and during stormy weather. The affected wrist measured $13\frac{1}{4}$ inches in circumference, the corresponding wrist of normal size measured $7\frac{3}{4}$ inches. There were two firm and hard protuberances over the styloid processes of the radius and of the ulna. On manipulating the parts between these protuberances, a sensation as of hard, movable bodies, impacted in fluid, was imparted to the fingers. He had applied tinc. iodine, preparations containing ammonia, and many ointments and other popular remedies. He was for some time under the treatment of the U. S. army surgeons, and had been heroically treated by a number of practitioners, by incisions, punctures, blisters, etc., as the cicatrices testify, and all without benefit.

I proposed Mr. Syme's operation, to which his consent was readily given. Accordingly, the next day (March 10th), I made an incision between the tendons of the extensor communis digitorum and the extensor carpi ulnaris muscles, the most available portion of the wrist, and cut down to the annular ligament which I divided. Imbedded in the substance of the enlarged wrist, along the incision, were a number of fibrous or cartilaginous bodies of different sizes, ranging from that of a flaxseed to a small cherry-stone, and of irregular shapes, depending perhaps upon their position, consistency, and the amount of pressure they sustained during their formation. The wrist was dressed antiseptically, a compress was applied over the divided annular ligament, to prevent, as in Mr. Syme's case, protrusion of the tendons.

On his return, on the 14th, he could pick up a pin with his thumb and index finger, and use his hand in other ways such as he had not been able to do for seventeen years. The pain had abated; he slept at night without an anodyne. The wound was kept open and treated upon general principles, until the end of the sixth week after the operation; when the affected

wrist was reduced to $8\frac{1}{4}$ inches in circumference. It was allowed to heal. Three and one-half months after the operation, he "made a whole hand" in the harvest field, raking and binding a swath of wheat for three consecutive days; and during the two years that have elapsed he has engaged in manual labour as a farm hand, suffering with scarcely any pain or other inconvenience. After excessive or long-continued exertion of the wrist, he says "it feels like giving out."

Prof. Gross in his *System of Surgery*, vol. i. p. 633, 5th ed., says this affection (chronic enlargement of the bursa) is "often very obstinate and troublesome, resisting not unfrequently the best directed efforts of the surgeon for their removal," and recommends "sorbefacient applications, as iodine and hydrochlorate of ammonia, blisters, mercurial inunctions, and systematic compression," and when these measures fail, "thorough excision," with the precaution to avoid injury to the synovial membrane of the articulations, but he does not mention division of the annular ligament as a remedy in the enlargements under consideration. We make special reference to Prof. Gross' treatment of this affection, because he is universally regarded as high surgical authority.

A remarkable feature in my case is that the integrity of the articulations and muscles was so slightly impaired by the morbid condition surrounding them for so many years, as to regain much of their former strength and usefulness, and that too in a short time after being relieved from their bondage. The fact that the location of the trouble in the two cases was in different parts of the wrist—one on the anterior and the other on the posterior portion, and that both were relieved by dividing the annular ligament subjacent to the affected part, strengthens the theory advanced by Mr. Syme. That the result of this operation in these two cases far exceeds the prognosis by the ordinary treatment is evident, and should, we think, recommend it to the favourable attention of the profession, and, in the language of Mr. Syme, "the complete success of which encourages me to hope that the method pursued will be found to afford an effectual remedy for a complaint which has hitherto proved so troublesome."

ARTICLE XV.

AMPUTATION AT THE SHOULDER-JOINT. By L. McLANE TIFFANY, M.D.,
of Baltimore, Professor of Surgery in the University of Maryland.

WHILE amputation of the arm at the shoulder-joint is a very successful operation, indeed, probably the most successful of major amputations, yet a fatal case occurring under my care, from secondary hemorrhage, has caused me to think that possibly, certain dangers being recognized, the mortality may be still further decreased.

What I shall say has special reference to cases of ex-articulation at the scapulo-humeral joint when necessitated, not only by bone injury, but accompanied by extensive lesion of soft parts,—such wounds, in fact, as are apt to be followed by sloughing.

There seems to be no end to the list of methods of procedure which at one time or another have been called into requisition to effect the desired result, Velpeau saying “that whoever had operated once considered it necessary to propose a new method.”

Le Dran passed a needle deeply beneath the artery and secured it over a compress. Then he made a transverse incision through the deltoid just below the acromion, effected the disarticulation and made a long axillary flap. The artery was then tied properly. La Faye made a large rectangular flap containing the deltoid, raised it, exposing the artery, which he tied, and divided the axillary tissues transversely; thus exactly reversing Le Dran's method. Dahl and Portal are credited with similar methods, replacing only the rectangular flap by a V-shaped one, apex down. Garengeot's method differed from that of Le Dran, inasmuch as both flaps were quadrilateral, and of equal length; he passed a provisional ligature beneath the main vessel. Dupuytren, Onsenort, and Cline are credited with methods differing but little from the preceding, the flaps being either cut by transfixion, or from without inwards. Bell made a circular incision joined by two lateral ones, thus forming rectangular flaps. Lisfranc improved Dupuytren's methods by entering the knife in the coraco-acromial space, opening the joint at once. Laroche, Sharp, Desault, Larrey, Dupuytren, Delpech, Scoutetten, Hello, Graefe, Sanson, Cornuau, Guthrie, Alanson, Verneuil, Velpeau, Spence, Pozet, Bertrandi, have all suggested modifications of existing methods according as circumstances seemed to warrant, until it would appear as if the subject were well exhausted, especially as Velpeau (Mott's translation, vol. ii. p. 561) has tried the “ovalar process reversed,” by which we are forced to imagine that he made his flaps attached to the amputated member and not to the trunk.

It is well recognized that in the treatment of disease where many remedies are mentioned, there is no specific, and this idea holds good of shoulder-joint amputations, so that it is fair to suppose that no method can justly be worthy the title of best.

The articulation is so well covered in front, behind, and above, that sufficient flap can always be obtained, while the vascular anastomoses are so free from the axilla and elsewhere, that sloughing occurs rarely, except as the result of direct violence, or, of course, hospital gangrene. Lastly, it must be remembered that the axilla is open below, and that it is a difficult matter to prevent good drainage, a fortunate circumstance having much to do with the recorded small mortality.

Attempting to see what operative measures have obtained the greatest success, I turned to the “Medical and Surgical History of the War,”

finding at p. 620 Surg. vol. 2d Pt. a record of 368 cases of primary amputation at the shoulder which recovered. The operation is described in 179 cases as follows :—

	Times.
Oval flap	26
Lisfranc	12
Larrey	10
Transfixion	16
Lateral flap	10
Antero-posterior flap	24
Double flap	23
Flap	44
External flap	4
Dupuytren	3
Circular	6
Malgaigne	1

In this it is probable that oval and Larrey refer to one and the same method, that Lisfranc and transfixion are each used to express the same manner of amputating; but lateral flap, antero-posterior flap, double flap, flap, leave very confused impressions in the mind of the reader as to the course of the incisions. Turning to page 632 of the same volume, there are recorded 117 fatal primary shoulder-joint amputations; in these cases the operation is described 45 times, the terms used being very similar to those in the first series.

Wishing to define the incisions described in the Medical and Surgical History, I consulted the usual text-books and discovered at a glance the cause of confusion, namely, that surgical authorities describe the same operation very differently; thus, Larrey's Amputation, Gross (vol. ii. p. 1075) says is formed of two oval flaps, one in front and the other behind (antero-posterior). Holmes (vol. iii. p. 78) describes Larrey's amputation as consisting of lateral flaps. A flap formed of the deltoid is called external or posterior by different writers, etc. etc. This lack of definition renders comparison of various methods impossible until a uniform system of nomenclature be adopted. In the absence of definite tabulated experience, and recognizing that many ways are advised by competent surgeons, it is tolerably safe to conclude that each case should be judged on its own merits, and flaps fashioned accordingly.

The fatal case to which I have referred is the following :—

CASE I.—J. B., aged 35 years, was run over by a train of loaded railway cars. The right humerus was crushed extensively, the head of the bone being comminuted; the skin covering the inner and anterior aspect of the arm was almost all torn away; the chest was much bruised.

I amputated at shoulder-joint by tying the axillary artery in the wound, fashioning a flap out of skin from behind and over the deltoid, and finally picking the fragments of humerus from the walls of the chest, some pieces being thrust deeply into the pectoral muscle. Sloughing of the bruised tissue took place, and the patient died of hemorrhage from the axillary artery on third day.

Post-mortem examination revealed a ragged opening in the artery nearly one inch above the ligature. Evidently the vessel had been injured and gave way when suppuration was established.

Now it is possible that although the shape of the flaps may be a matter of small importance, yet there are other circumstances incident to amputation, a due regard to which may be of advantage to the patient, and one of prime interest is the treatment of the main artery, and it is to this that I wish to call attention in this paper; incidentally also to the nerves.

Turning to the "Medical and Surgical History," etc., I find, Surg. vol. part 2, page 635, as follows: "The causes of fatal results in this series of one hundred and seventeen amputations are not particularly specified in more than one-half the instances. Consecutive hemorrhage is assigned as the cause of fatality in twelve cases, including nine in which large trunks were tied." About one case in five.

On page 642 is a record of seventy-five fatal cases of intermediary amputations (from 3d to 30th day); the cause of death is given in fifty-nine instances, and of these, thirteen succumbed to hemorrhage; one in four and a half. So large a proportion in the above tables of fatal cases is due to hemorrhage as to justify any suggestion for operating with a view to obtaining more successful results. Unfortunately the history of the cases as published does not enable one to appreciate the reason why hemorrhage took place, but a certain number, cases 20, 26, 77, 89 (table 44, page 632), clearly show gunshot injury high up the arm, such as might well be followed by sloughing with the usual accidents.

In civil practice amputation at the shoulder other than for tumours is rarely required, except for railway or machinery crushes, and it is under just such circumstances that the influence of violence is felt far beyond the region immediately involved, and therefore the tendency to suppurate is felt beyond the site of visible injury. Not only will bones be fissured, as after gunshot wounds, but the muscles show rupture of fibre and points of extravasated blood throughout their length; the conduct of vessels subject to violent extension is too well known to require more than passing mention. Amputation for crushing injury, unless effected at some distance from the seat of violence, is always followed by much suppuration, and where the injured member is very muscular, suppuration is apt to be correspondingly profuse; again, in consequence of unequal strain being put upon different muscles they will be injured in different degrees and slough unequally.

When crushing injury occurs in the neighbourhood of the shoulder, so near indeed that the flaps formed in amputation are composed of strained if not bruised tissue, suppuration and sloughing result, which is very apt to extend along the intermuscular spaces, in which spaces, of course, are found vessels and nerves; it follows necessarily then that divided vessels

should be secured some distance from the face of the flap, the ligated point being thereby further removed from the site of suppuration.

Again, the humerus being comminuted, the arm is greatly shortened by muscular retraction, the artery retracts, and on amputating, the vessel is divided at a lower level than would occur were the bone not broken, or in other words at a point which has already been subjected to the same violence that broke the bone, for it is to be remembered that the vessel usually escapes destruction at the same time that the bone is crushed. This renders the artery apt to give way when profuse suppuration of the bruised flaps occurs, since the vitality of the arterial tunics is still further impaired by the neighbouring inflammatory process. This is the explanation to which I was led when considering the circumstances attending the fatal issue in Case I., and in subsequent operations to avoid a similar untoward result, I have always ligated the main vessel at a distance from the face of the wound through a new incision if necessary, or else have dissected the vessel from the flap by drawing it strongly down, and tying it quite a distance from the point of section. It is scarcely necessary to say that the flaps are to be left well open that the products of inflammation may freely escape.

The method of procedure is simple; the arm being removed, the axillary artery is grasped with toothed forceps, drawn out and stripped of connective tissue for certainly three inches—the fingers suffice to do this—a ligature is then applied and the vessel divided distal to the string. Should a large branch, *i. e.*, subscapular, appear, it requires a separate ligature. Lest the suppuration following the severe injuries under consideration should involve the large trunks of the brachial plexus and give rise to neuralgia on cicatrization, it is my habit to draw strongly upon the nerves and cut them with scissors quite a distance from the face of the flaps, so far with a happy result.

The following cases illustrate the method suggested:—

CASE II.—W. B., *æt.* 22 years, had his right arm caught in machinery belting and dragged between cogwheels. I saw the patient four hours after the accident. The humerus was crushed into many fragments, the comminution extending to the head of the bone; the soft parts were pulpi-fied, especially along the inner aspect of the arm. Amputation at the shoulder was effected by raising a deltoid flap of bruised tissue from without inwards, exarticulating and cutting a short inner flap from within outwards. The artery was secured provisionally, and then a ligature by means of an aneurism needle passed around the vessel above the bruised tissues. The nerves were drawn down and divided as high as possible. Much sloughing and suppuration ensued, followed by recovery. The stump was not painful when seen four years later, nor had it been.

CASE III.—W. E., aged 25, while intoxicated, was run over by laden railway cars. Left arm crushed to the shoulder. Amputation at shoulder-joint decided upon. In order to gain sufficient flap, skin was taken from in front of, and over, the acromion, cut with a scalpel from without in-

wards; a second flap below containing vessels and nerves was cut, after disarticulating, from within outwards. The artery was tied in the manner already indicated. The nerves were drawn upon and then cut as deeply in the wound as possible. Recovery ensued without notable circumstance. A painless scar marks the site of operation nine years after loss of arm.

CASE IV.—H. B., aged 25 years, was run over by railway cars. He evidently fell with the right arm resting on, not across, the rail, for the hand, forearm, and arm, as high as the surgical neck of the humerus were torn and crushed to a pulp. The deltoid was bruised and discoloured when seen one hour after injury. A deltoid flap was raised by transfixion, and after exarticulating a short lower flap cut from within outwards; both flaps were of bruised tissue. The axillary artery was strongly drawn down and cleared of tissue well beyond the surface of the flap, tied, and allowed to retract. The nerves were dissected out and divided. The wound was left almost entirely open; suppuration of bruised tissue and abscess in pectoral muscle took place, but the wound healed by granulation, and a painless stump resulted.

ARTICLE XVI.

THE COMPARATIVE ACTION OF HYDROBROMATE OF HOMATROPINE AND OF SULPHATE OF ATROPIA UPON THE IRIS AND CILIARY MUSCLE. By CHAS. A. OLIVER, M.D., of Philadelphia.

THESE series of experiments¹ were conducted on ten young emmetropic² eyes, care being taken to obtain persons of intelligence, and place them under the same conditions in reference to light and time of day.

The accompanying tables, based upon those of Donders, with the exception that here the actual loss of accommodation is expressed, instead of the remaining power, show the action of a single instillation of the one-fortieth and the one-twentieth of a grain each of hydrobromate of homatropine and of sulphate of atropia into an emmetropic eye, after intervals of one month.

¹ The author is engaged in a series of similar experiments with *Datura stramonium*, *Hyoscyamus niger*, *Duboisia myoporoides*, etc., which he intends combining with this paper, for future publication. It was his intention to make use of all the drugs upon the same eye, at the proposed intervals of one month, but through unavoidable circumstances he has been obliged to find a second emmetropic eye, thus making a slight break in the paper.

² Several previously corrected for H+Ah, in all of which the correcting glass and its distance from the eye were calculated for.

In every case, as soon as accommodation for Sn. $1\frac{1}{2}$ became impossible, a convex glass was placed one-half inch before the eye—this in all instances being taken into account.

EXPLANATION.—The numbers under the line A A, designate the number of minutes after instillation. The numbers from B to A, ciliary power, expressed in dioptics. The numbers from A to E the horizontal diameter of the pupil, in millimetres. The dotted line, the action of atropia. The ruled line, the action of homatropine. The heavy dots, the times of examination.

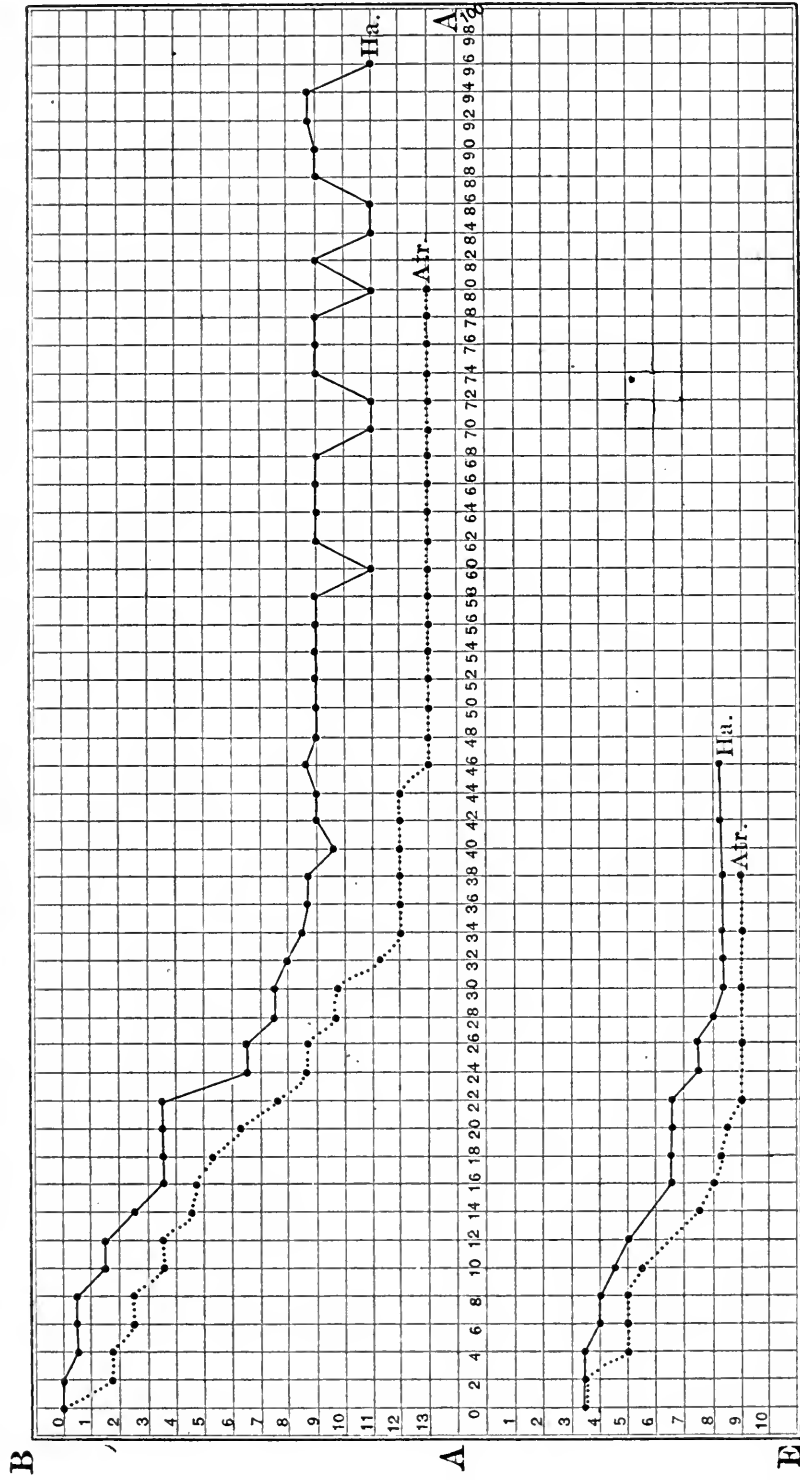
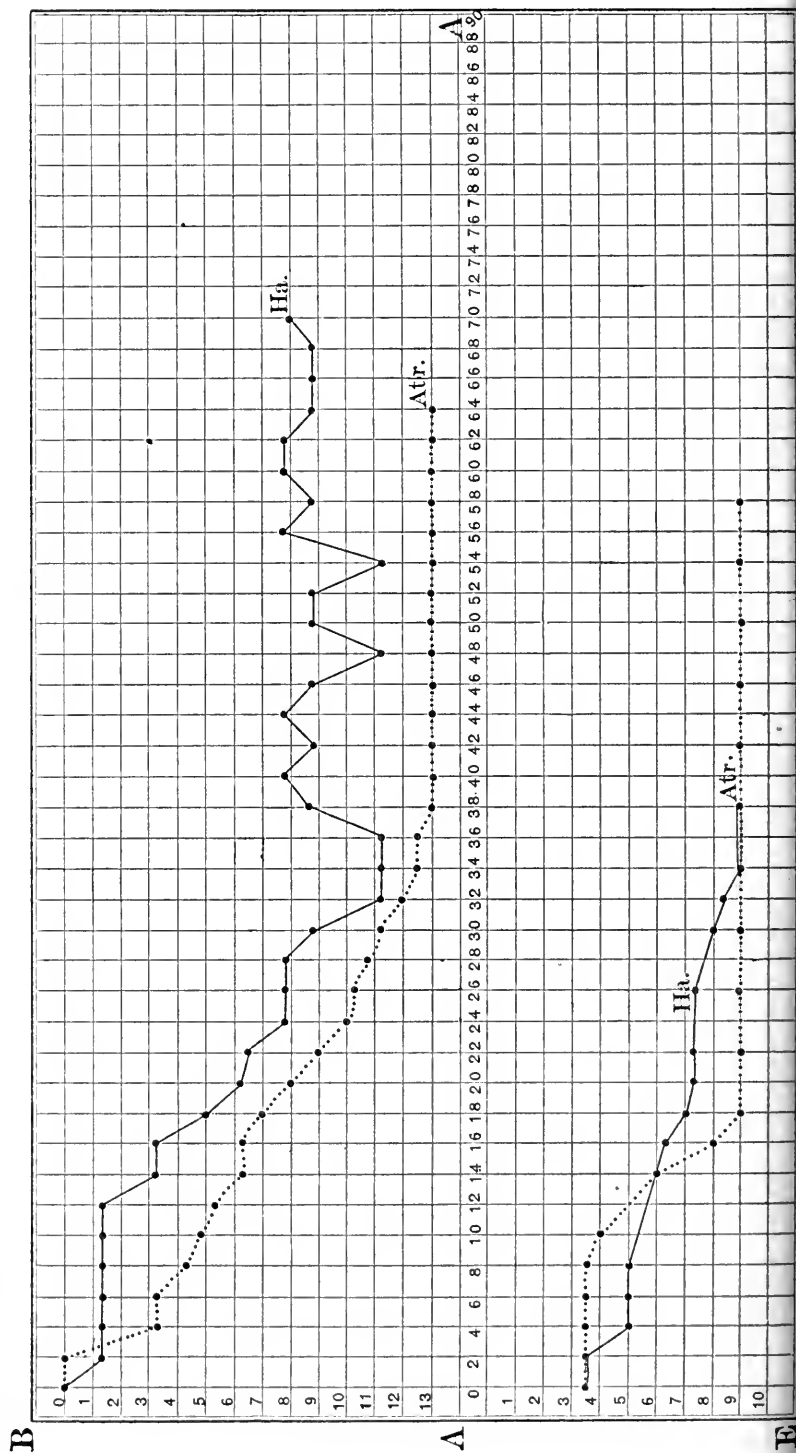


TABLE II.—Comparative actions of the one-twentieth of a grain each.

EXPLANATION.—The numbers under the line *A*, designate the number of minutes after instillation. The numbers from *B* to *A*, ciliary power, expressed in dioptries. The numbers from *A* to *E* the horizontal diameter of the pupil, in millimètres. The dotted line, the action of atropia. The ruled line, the action of homatropine. The heavy dots, the times of examination.



Observations.—1. The mydriasis of a single instillation of the one-fortieth of a grain of sulphate of atropia is consummated in twenty-two minutes, whilst the utmost dilatation of the pupil occasioned by a single instillation of the one-fortieth of a grain of hydrobromate of homatropine takes thirty minutes.

2. The mydriasis of a single instillation of the one-twentieth of a grain of sulphate of atropia occurs in eighteen minutes, whilst the mydriasis produced by a single instillation of the one-twentieth of a grain of hydrobromate of homatropine takes thirty-four minutes.

3. The ciliary paralysis of a single instillation of the one-fortieth of a grain of sulphate of atropia is attained in forty-six minutes, whilst the utmost intensity¹ of the action of a single instillation of the one-fortieth of a grain of hydrobromate of homatropine takes place in sixty minutes.

4. The ciliary paralysis of a single instillation of the one-twentieth of a grain of sulphate of atropia is attained in thirty-eight minutes, whilst the utmost loss of accommodation occasioned by a single instillation of the one-twentieth of a grain of hydrobromate of homatropine takes place in thirty-two minutes.

5. The single instillation of the one-fortieth of a grain of hydrobromate of homatropine has not in any instance produced full dilatation of the pupil, whilst, in every case, the single instillation of the one-fortieth of a grain of sulphate of atropia has caused maximum dilatation.

6. In the majority of cases examined, the single instillation of the one-twentieth of a grain of hydrobromate of homatropine caused maximum dilatation² of the pupil, whilst in every instance full dilatation was produced by the single instillation of the one-twentieth of a grain of sulphate of atropia.

7. The utmost intensity of the action of the single instillation of the one-fortieth of a grain of hydrobromate of homatropine upon the ciliary muscle, is maintained for about two to four minutes, the same being true for the single instillation of the one-twentieth of a grain of the same drug, whilst the ciliary paralysis of both the one-fortieth and the one-twentieth of a grain of sulphate of atropia is stationary for many hours.

8. By accurate observations made every second or third hour after the utmost action of the single instillation of the one-fortieth of a grain of hydrobromate of homatropine, it was found that the diameter of the pupil became normal in about thirty hours, and full re-establishment of the power of the ciliary muscle in fourteen hours.

9. By observations made every second or third hour after the mydriasis and utmost loss of ciliary action by the single instillation of the one-twentieth of a grain of hydrobromate of homatropine were estab-

¹ I have not deemed it necessary to enter into the details of the actual loss, as reference to the table will explain.

² Vide case noted in table B.

lished, it was found that the pupil became normal in about fifty hours, and full accommodative power returned in twenty-four hours.

10. In the mydriasis and ciliary paralysis of the single instillation of both the one-fortieth and the one-twentieth of a grain of sulphate of atropia, the pupillary diameters became normal, and full accommodation returned in from ten to fourteen days.

During the course of the experiments with the homatropine, it was noticed—

1. After the time of its utmost action, the near point was exceedingly difficult to determine on account of circles of diffusion being suddenly thrown around the test object, due to clonic spasm of the ciliary muscle, as shown by the table.

2. If after the lapse of twenty-four hours, a second instillation of the one-twentieth of a grain was made, almost full radiary contraction of the iris took place in from ten to twelve minutes, whilst the utmost action of the drug on the ciliary muscle took but ten to eighteen minutes' time,¹ but in no instance was there total loss of accommodation.

3. If at the time of the utmost action of the single instillation of the one-twentieth of a grain of the homatropine upon the ciliary muscle the one-sixtieth of a grain of the same drug was instilled, *complete* paralysis of the muscle was established in fifty-four minutes, which remained stationary more than thirty minutes.²

4. In nearly every case, conjunctival irritation and injection, with a sense of astringency and smarting.³

5. No observable appearance of constitutional disturbance, except some dryness of fauces and a peculiar bitter taste.⁴

Conclusions.—1. A single instillation of either the one-fortieth or the one-twentieth of a grain of hydrobromate of homatropine is insufficient to paralyze accommodation, and hence is of no value in properly estimating refractive error.

2. Complete paralysis of the ciliary muscle can be obtained by a single instillation of either the one-fortieth or the one-twentieth of a grain of sulphate of atropia.

3. A single instillation of the one-twentieth of a grain of hydrobromate of homatropine is capable of producing full dilatation of the pupil;⁵ whilst

¹ This result not invariable, two cases requiring the same length of time as on previous day.

² The exact length of time not accurately known, as examination not continued beyond one-half hour after full paralysis was established; the thirty minutes being considered sufficient time to correct any existing refractive error.

³ Thinking the preparation might not be neutral, it was submitted to the litmus test, revealing marked acidity.

⁴ Here it might be proper to state that many of the unpleasant constitutional effects seen in the use of mydriatics, are dependent upon the physician; the drugs often being used without a thought in reference to strength, quantity and repetition.

⁵ I give this statement with some reserve. In the majority of cases it was undoubtedly so, as in the case noted.

it is impossible to produce maximum dilatation by a single instillation of the one-fortieth of a grain of the same drug.

4. Maximum dilatation of the pupil is produced by a single instillation of either the one-fortieth or the one-twentieth of a grain of sulphate of atropia.

5. The utmost action of a single instillation of the one-fortieth of a grain of hydrobromate of homatropine upon the ciliary muscle, is attained later and lost sooner than the full paralysis occasioned by a single instillation of an equivalent amount of sulphate of atropia.

6. The utmost action of a single instillation of the one-twentieth of a grain of hydrobromate of homatropine upon the ciliary muscle is attained sooner and more quickly lost than the full paralysis occasioned by a single instillation of an equivalent amount of sulphate of atropia.

7. The mydriasis of a single instillation of either the one-fortieth or the one-twentieth of a grain of hydrobromate of homatropine is not so quickly produced, and is of shorter duration than that of a single instillation of either the one-fortieth or the one-twentieth of a grain of sulphate of atropia.

8. *Complete* ciliary paralysis can be obtained by a single instillation of the one-sixtieth of a grain of hydrobromate of homatropine at the time of the utmost action of a single instillation of the one-twentieth of a grain of hydrobromate of homatropine, thus allowing ametropia to be accurately determined.

9. A single instillation of either the one-fortieth or the one-twentieth of a grain of hydrobromate of homatropine, by reason of its transient effect on the iris and ciliary muscle, is valuable when we desire accurate ophthalmoscopic examinations in cases dependent upon their use.

10. The conjunctival irritation of hydrobromate of homatropine may be avoided by the use of an absolutely neutral salt.

11. Single instillations of the amounts given, of either of the drugs, are perfectly free from injurious constitutional effect.

I here desire to express my thanks to Dr. William F. Norris for many valuable suggestions, and to Drs. George T. Lewis, C. W. Fox, and G. H. Halberstadt for assistance given.

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ARTICLE XVII.

STAB WOUND OF THE NECK AND DIVISION OF THE RIGHT RECURRENT LARYNGEAL NERVE, FOLLOWED IMMEDIATELY BY ABSOLUTE APHONIA. By GEORGE M. LEFFERTS, M.D., Clinical Professor of Laryngoscopy and Diseases of the Throat, College of Physicians and Surgeons, New York, etc.

THE great rarity of the following case will, I believe, render the history one of general interest.

On January 5th, 1881, the patient, a strong, healthy German woman, æt. 47, while lying upon her left side, in bed, was approached suddenly by her drunken husband and stabbed in the neck with a long narrow-bladed pair of shears; turning and endeavouring to rise, she received a second blow upon the ramus of the lower jaw, causing a long lacerated wound. Attempting to scream aloud for help, she found herself voiceless. On April 5th I was consulted on account of the aphonia, which had persisted since the injury.

Examination.—A long, irregular cicatrix on the border of the lower jaw, right side, a short distance from its angle; a second small one, evidently the result of a punctured wound, at the inner border of the sternocleido-mastoid muscle, at the level of the lower border of the cricoid cartilage on the same side. Patient completely aphonic, speaking only in a whisper, and suffering from slight dyspnoea, especially on exertion. The laryngoscope showed absolute paralysis of all of the muscles of the right vocal cord, it being fixed in the cadaveric position, *e. g.*, midway between the extremes of adduction and abduction, and motionless on attempted phonation or inspiration. The left vocal cord moves freely, and compensates for the defective action of its fellow by passing the median line on adduction, its arytenoid cartilage passing in front of that of the paralyzed cord, and thus fairly approximating the edges of the cords. Laryngeal mucous membrane normal.

Remarks.—The condition is of course an incurable one; the only possible error in diagnosis lies in default of a laryngoscopic inspection, in the supposition that the case was one of functional paralysis due to sudden emotion and terror. This theory is at once disproven by the direct examination of the condition of the vocal cords. That a clumsy instrument, roughly used, should have escaped wounding the vital vessels which it must have closely passed in its inward course, and severed alone a nerve the size of the recurrent lying in a protected situation, is hardly comprehensible. The fact, however, stands.

ARTICLE XVIII.

ON SOME OF THE CONDITIONS AFFECTING THE ORIGIN AND COURSE OF PULMONARY PHTHISIS. By BEVERLEY ROBINSON, M.D., Lecturer upon Clinical Medicine at the Bellevue Hospital Medical College, New York.

THE conditions affecting the origin and course of pulmonary phthisis are so numerous that it would be impossible, in the limits of a journal article, to properly consider even the majority of them. In the following pages I desire to call attention to three of them, to which my individual experience has directed my attention, *viz.* :—

- I. Inflammation of the respiratory organs as they affect the origin and course of pulmonary phthisis.
- II. Syphilis in its relations to the origin and course of pulmonary phthisis.
- III. Contagion and inoculation.

These subjects are especially selected on account of their great importance and actual interest.

1. Inflammation of the respiratory organs as they affect the origin and course of pulmonary phthisis.

In this connection I would first direct attention to the influence of (a) laryngitis and bronchitis. I know full well, and notwithstanding the ancient views of Portal and Borsieri, who contended that pulmonary phthisis was frequently due to an ordinary cold, that this view has since that time been warmly debated. Louis, in his researches upon pulmonary phthisis, where the numerical method is so exhaustively adopted, endeavours to show by the thorough analysis of eighty cases that bronchitis has no direct effect in producing pulmonary phthisis. Since Louis' day students and practitioners have become familiar with Niemeyer's conclusions, who recognizes in bronchitis a direct and very efficient condition of the origin and progress of pulmonary phthisis. Amongst them he states that it extends its march to the pulmonary parenchyma, and that an acute bronchopneumonia thus produced is too apt to lead to cheesy nodules which rapidly soften and form cavities occasioning after this manner an advanced stage of pneumonic phthisis. These conclusions are strongly combated by Flint in his late remarkable treatise on "Pulmonary Phthisis." If I refer to my own notes, I find that I am forcibly obliged to adopt the view that bronchitis, but more particularly laryngo-bronchitis, is an efficient and direct condition of the origin and course of pulmonary phthisis. In my experience, and upon close questioning, I find many patients who date the origin of their pulmonary affection to taking "cold." This cold has frequently been accompanied with some hoarseness and cough, which instead of disappearing rapidly and completely, remained and became aggravated and more distressing as time elapsed. In a fair proportion of cases I have been unable to trace the persistence of the hoarseness and cough, either to hereditary influences, or bad hygienic conditions. True it is, however, that an occasional and efficient condition of recurrence of an attack of laryngitis or bronchitis in its primary intensity was taking a fresh "cold," and this succession of acute attacks was obviously most detrimental to pulmonary integrity. Whenever the inflammatory change has seated itself within the larynx, it has almost invariably augmented the frequency and intensity of cough, and in a small degree increased the quantity of sputa. I have likewise remarked that such cases are more depressing to the general condition than those in which the inflammation is limited to the bronchial mucous membrane. Besides the increased cough, dysphagia, which accompanied the laryngitis at times, was seemingly the reason why little nutriment was taken, and thus helped along rapid diminution of flesh and strength. No doubt in numerous instances the laryngitis followed upon the bronchitis, or was at most an unimportant dependent of it, but there were numerous examples in which it appeared

to me that but for the laryngitis the bronchitis would have had a much better chance of cure. Following directly upon the laryngo-bronchitis, I have clinically observed the advent of dulness at the apices with harsh breathing and more numerous râles at this region. These physical signs when combined with grave general symptoms left me but one probable belief, viz., that the lung had become consolidated in its upper portion and that this consolidation was most probably occasioned in the manner referred to.

(b) The inflammatory condition of the pulmonary parenchyma, such as we encounter in lobar pneumonia, has very rarely appeared to me to affect the origin and course of pulmonary phthisis. This is particularly true in almost all instances where the pneumonia attacked an individual previously healthy. Usually when he had recovered from this acute disease, cough and expectoration entirely disappeared; previous strength and flesh were regained, and shortly the patient was seemingly as well as before. At times, and when a whole lobe or lung became consolidated by reason of acute inflammation in a patient presumably phthisical already, it has obviously been an efficient condition of the more rapid advance of the phthisical disease of the lungs. True it is, however, that broncho-pneumonia, whilst it is more readily and frequently produced by the presence of miliary tubercle than the lobar form, is also more likely to lead to its manifestation and hasten its march. Nothing indeed is more insidious at times than the development of small nodules of consolidation of this kind in the lungs. If they are situated centrally, a slight rise of temperature may be almost the only symptom indicative of their existence. As they extend towards the surface of the lungs, or fresh nodules form more superficially, physical signs may clearly prove their existence. In very many examples of course both the local and general phenomena present, are sufficiently characteristic to enable us to affirm their development. Now, then, these nodules, instead of resolving and disappearing completely, will oftentimes become still more solid and cheesy, and around their outer limits too frequently do we recognize at the autopsy numerous miliary tubercles which evidently were under their dependence and proceeded directly from them by auto-inoculation carried on through the vascular supply of the affected region. It may be affirmed that it required a predisposing constitutional state to permit such effects to be produced. Too frequently, I am confident, no such hypothesis is warranted; and the local infiltration of broncho-pneumonia once established marches inevitably towards phthisical development in the pulmonary structure. In this opinion I hold to what the pathology of to-day certainly teaches, viz., that whenever catarrhal products become impacted in the smaller bronchi the pulmonary lobules are apt to become degenerated, general infiltration of pulmonary fibrous tissue takes place, and broncho-pneumonia, leading often to pulmonary phthisis, is developed. It is not essential,

moreover, to believe with Watson that "dormant predisposition is awakened into actual disease and latent tubercles are accelerated" by intercurrent inflammation of pulmonary tissue.

(c) The influence of pleurisy upon the origin and course of pulmonary phthisis has been variously determined by different authors. While some see in the existence of a previous or present pleuritic inflammation a very direct and powerful condition of the development of pulmonary phthisis, as many other writers contend that the pleurisy is usually produced by the miliary tubercles already present, sometimes in its layers, sometimes immediately beneath them. Certain it is, as Louis has affirmed, and as almost all autopsies show, the most frequent pathological accompaniment of pulmonary phthisis is pleuritic adhesions. These adhesions may be partial or general. They may consist, indeed, only of a few bands, or fibres, connecting the two pleural surfaces together. Still they almost invariably are found in a greater or less extent of the pulmonary surface. The warmest advocate of their causative influence in producing pulmonary phthisis in the last few years has been Dr. J. R. Leaming, of New York, and he has made a new division of pulmonary phthisis based mainly on this conviction. To such a belief I can but oppose the fact that miliary tubercles are not infrequently seen within or upon the surface of the pleura, and, notwithstanding their presence, no pleuritic inflammation has been established. If we take into account, however, the frequency of pleuritic adhesions localized at the apices of the lungs, and the fact that these adhesions have obviously been the cause at times of pain and certain stethoscopic signs, when pulmonary respiration at their level was still vesicular and uncommonly pure—that following occasionally upon these signs, and after the lapse of several months, the evidences of adhesions remaining, cough becomes more frequent and harassing, flesh and strength are notably diminished, and roughened breathing with stationary small moist râles are discovered, all indicating the presence of pulmonary phthisis—how can we fail to recognize that pleuritis is a modifying agent of great importance as regards the origin of pulmonary phthisis? Whenever pulmonary phthisis is already developed, and pleuritic adhesions are added to it, there is little reason to doubt that they hasten very materially the onward and downward march of the former. When not yet produced, but imminently threatened, they effect this development, doubtless, in a very analogous way to what we recognize when other serous membranes become inflamed, or thickened, as, for example, when peritonitis is a primary condition of degenerative changes in the intestines, or pericarditis precedes a somewhat similar alteration in the connective tissue and muscular fibre of the cardiac walls. By their presence, chronic congestion and hyperplasia of the pulmonary tissue are obviously occasioned, being directly due to their contraction and to the pressure effects thus

produced. In these changes further degeneration is liable to occur, and crude tubercle often originates.

II. *Syphilis in its relations to the origin and course of pulmonary phthisis.*

As is well known, the belief that pulmonary phthisis may be directly caused by syphilis is no new one. As far back as Morgagni such an opinion was sustained, and so late as the days of Laennec and Andral the notion was a prevalent one that phthisis was a not infrequent result of syphilitic infection. At this period it was held that the other pulmonary diseases which to-day we recognize as being distinctly syphilitic in their causation were intercurrent affections of quite different origin.

How does the question stand in our day? Is there or is there not a pulmonary phthisis which is caused directly by syphilis? Now, if by phthisis we mean tuberculosis, I answer in the negative; but if by phthisis we mean merely a wasting febrile disease, ulcerative in character, affecting particularly the lung-structures, why then I answer that there is such an affection. If the former view be held—namely, that all phthisis is tubercular—then the influence of syphilis in its etiology is but that of a predisposing condition. Syphilis, like most general diseases, impairs the nutrition of the economy, reduces the strength of the individual below the normal, and, finally, when the dyscrasia is firmly seated, becomes doubtless an important factor in the development of lung-disease, phthisical and even tubercular in nature. As regards the latter tenet, we know already and without question that, in the tertiary period of syphilis, interstitial pneumonia and gummy deposits are not uncommonly found in the lung-tissue. Depaul made the discovery in 1851. Since that time, Virchow, Weber, Lancereaux, Lebert, Moxon, Fournier, Randohr, Gamberini, and others have confirmed and extended our knowledge of these and other specific pathological conditions. Oftentimes, at the autopsies of syphilitic subjects, cavities have been found in different portions of the lungs, surrounded by walls of fibrous tissue, and presenting to the naked eye and to microscopic examination characters not dissimilar to those found in cadavers of persons who have succumbed to tubercular disease. And yet there are some distinguishing features, it is said, from a pathological standpoint: The nodules indicative of syphilitic changes are situated particularly in the lower lobes. They are less numerous and of larger size than the cheesy nodules of tubercular phthisis. Their colour and consistency are also signs by which they may be at times differentiated. The gummata are white or yellow, never transparent like miliary tubercle. They are of more uniform structure, and, if they break down, their destruction, on account of the nature of their capsule, is never so complete as that of a tubercular deposit. (Fournier, quoted by Bumstead, *Venereal Diseases*, 4th ed., p. 629.)

Whilst the above characters exist at times after death, and will then

enable us to distinguish syphilitic pulmonary disease from that which is of tubercular nature, they are not always present. Prof. Gamberini (*American Journal of the Medical Sciences*, April, 1881) reports two cases in which the syphilitic lesion was situated in the upper lobe of a lung, and also shows that the course of syphilitic disease may be both slow and apyretic. Moreover, he states that even after death tubercle cannot always be distinguished from gumma. How is it prior to death? Here the situation is at times relatively easy; often very difficult. Of course, if with the history of an infecting sore we find manifold cutaneous and other lesions, obviously of syphilitic nature, any pulmonary symptoms observed would be apt to be attributed, and properly, to the same diathesis. In such instances, the direct ocular examination of the fauces and pharynx will often reveal signs of great diagnostic value, as, for example, the red symmetrical bands which mark the pillars (Mackenzie), the dry, shiny appearance of the pharynx, and the red and enlarged papillæ on the back of the tongue (Seiler). To this examination may profitably be added an expert one by means of the laryngoscope. Only very lately, Dr. Carl Seiler has published two cases in which this instrument was of much practical value in the diagnosis and treatment (vide *Medical and Surgical Reporter*, April 16, 1881). It would appear from the reading of Dr. Seiler's paper that a like experience has been already communicated to the profession by Dr. John Schnitzler, of Vienna ("Die Lungen Syphilis," 1880). But—supposing the signs of an ulcerative pulmonary affection manifest themselves and progress rapidly, and that neither the history nor examination of the patient reveals the existence of syphilis—how can we determine whether the intra-pulmonary condition is or is not occasioned by syphilis? Frequently, neither rational symptoms nor physical signs will permit us to make the distinction. Almost everything points to the existence of tubercular deposit which has reached the stage of cavities. Even the family history may give increased certainty to this conviction. There may be emaciation, loss of strength, continued fever, profuse purulent expectoration, obstinate cough, and all the accompanying stethoscopic signs of pulmonary phthisis at an advanced period. Treatment alone by mercury and iodide of potash is the touch-stone of this condition when nothing else is, and I have already seen more than one patient, who, in the state described, has been immensely benefited by these remedies, though cod-liver oil and the hypophosphites had been given without appreciable good effects.

In view of these cases what shall we say? Will the mere location of a cavity prove its nature? Evidently not, for I have myself seen the apices affected with destructive lesions, which were only ameliorated by specific medication. And the other pathological conditions already mentioned are not by any means constant at the autopsy. On the contrary, there are patients in whom the advanced phthisical disease is not separa-

ble by our most thorough methods of investigation from those on the one hand which are due to syphilis, or on the other, occasioned directly by tubercle. The best we can affirm at the present time is, that there is a pulmonary phthisical affection which appears occasionally in the tertiary stage of syphilis, and which offers by all recognizable signs before death, and at times by those revealed at the autopsy, such close resemblances with advanced tubercular consumption that we are compelled to acknowledge our inability to affirm its precise nature. This position being accepted, it should be recognized that whenever a phthisical predisposition exists already in a patient, and when this patient unfortunately becomes inoculated with syphilis, he has contracted an exceptional morbid imminence to the origin and rapid progress of pulmonary phthisis. Further these dyscrasiæ may march side by side, and post-mortem revelations may indicate merely, as Wagner has shown, that one constitutional disease is at most but modified by the other.

III. *Contagion and Inoculation.*

These two subjects touch one another so closely to-day by the experimental researches of Villemin (1865-66), Marcet, Sanderson, Clark, Fox, and later by Virchow, Schottelius, and Cohnheim, that I naturally wish to consider them together. The medical world in our time has been much divided in regard to the question of direct transmission of pulmonary phthisis. Some there are who can never recognize its existence, always inferring that hereditary predisposition, or bad hygienic conditions are mainly instrumental in its origin and progress. Alongside of this conclusion stand unfortunately numerous undeniable instances in which pulmonary consumption is traceable without question, to breathing an infected atmosphere from a consumptive patient during many weeks or months. Husbands, in previous strong and vigorous health, after caring for phthisical wives, sleeping in the same bed and breathing the same air, have undeniably become consumptives. Wives more frequently, after being placed in similar position as regards affected husbands, have after a time developed tubercular disease, when no explanation other than infection through contact could be satisfactorily offered. These and many analogous examples would suffice to show that in a certain number of well ascertained conditions, the liability to contracting pulmonary phthisis through contact is great. It becomes, therefore, the duty of practitioners to urge the importance of preventive measures. These should be—

(a) Separation as far as possible of healthy from affected individuals. ¹

(b) Thorough ventilation of all rooms where a husband, wife, sister, or nurse is forcibly obliged to remain many hours of the twenty-four in close attendance upon a phthisical subject.

Is pulmonary phthisis transmissible by food? Chauveau's, Colin's, and other experimental researches prove conclusively :—

1st. That tubercular disease is frequent among cattle, and especially amongst cows and oxen.

2d. That the contact of a diseased animal with a healthy one for a long period, is almost sure to communicate phthisical disease to the other before in a healthy condition. From numerous examples, in which the milk of tubercular cows had been, during many months, the chief source of nutrition of certain children who became pale, emaciated, and finally developed tubercular disease, it is fair to assume that in milk of this origin we have a fruitful source of pulmonary phthisis. Boards of health, properly organized, are, therefore, called upon imperatively to take cognizance of these facts, and to see to it that the milch cows of our cities and towns are unaffected with the "pearl" disease, which is nothing more nor less than a disease similar to pulmonary phthisis in man. Whether the consumption of meat from these diseased animals is capable of producing pulmonary phthisis in man is still debatable, the cooking of such meat appearing to act as an antidote to contagion. The question of the contagion of pulmonary phthisis rests to a great degree upon the possibility of its inoculability. The first experiments of Villemin, Professor at Val de Grace, in 1865, appeared to settle this for a time in the affirmative. Later, Fox, Clark, and Sanderson showed that tubercular disease might be produced by substances not at all specific in nature. Within a year this matter has again been taken up by Cohnheim, and we find ourselves forcibly obliged to admit that, from the inoculation of tubercular or purulent material taken from a phthisical patient, pulmonary phthisis in animals may invariably be developed. It would seem, too, as if the medical world were obliged once more to hold the view first promulgated by Laennec, that pneumonic phthisis and tubercular phthisis are one and the same disease. The investigations of Tappeiner have also indubitably shown that the mere breathing of atomized watery solutions of the sputa of phthisical animals will convey infection to healthy animals. It is, therefore, fairly presumable, in conclusion, from manifold experiments, and more particularly from the latest and most convincing of all, those of Cohnheim, of Leipzig, that pulmonary phthisis in man may be conveyed by—

1st. *The ingesta*, as by the flesh or milk from tubercular cows.

2d. *Inhalation*, as by the particles of sputa carried in the atmosphere directly from phthisical patients.

3d. *Direct inoculation*, as by an abraded surface of a part of the integument through which tubercular matter can be absorbed.

I sum up this brief and imperfect *exposé* of a most important subject by a citation taken from Drake: "A disbelief in the contagion of consumption is highly favourable to the spread of that disease (if it can be really propagated in that mode), inasmuch as in private practice and both in civil and military hospitals no measures of prevention are employed." (Quoted by Clapp: "Is Consumption Contagious?" etc., Boston, 1881.)

ARTICLE XIX.

THE SORGHUM VULGARE, OR BROOM-CORN SEED, IN CYSTITIS. By ALEX. Y. P. GARNETT, M.D., Emeritus Professor of Clinical Medicine in the National Medical College, Washington, D. C.

THE recent articles which have appeared in different medical journals directing attention to the therapeutic virtues of the stigmata of maize as a remedy in cystitis, prompt me to furnish for publication my experience in the treatment of that disease, with the seed of the *Sorghum vulgare*, especially as this remedy, so far as I can ascertain, has never been introduced to the profession, and holds no place as such in any of the systems of practice or in any of the journal articles which I have seen.

Whilst there seems to have been some knowledge of the fact among certain practitioners of medicine in this section of the country, that the seeds of the common broom-corn possessed to some extent curative virtues in renal and cystic affections, this knowledge has never been utilized by experimental tests of such qualities. On the contrary, I find upon investigation that this plant has evidently been confounded with the ancient remedy for dropsy, the *Sarothamnus scoparius* or broom tops, and has probably never been used at all. By reference to the last edition of the *National Dispensatory*, we find that as far back as the seventeenth century the broom tops have been used as a remedy in dropsy and regarded as especially efficacious in those forms of anasarca produced by cardiac disease. At a later period several German and English writers have called attention to its virtues in the various forms of dropsical effusion and in certain inflammations of the genito-urinary organs. No special claims, however, seem to have been made for it as a remedy in cystitis until very recently.

As far back as 1860, I was induced to employ the broom-corn seed in cases of cystitis both chronic and acute, at the suggestion of those who had seen it used with great reputed benefit among the plantation negroes of Maryland and Virginia. The mode of administration practised by them was in the form of a decoction of the seed made by boiling two ounces (3ij) of the seed in a quart of water down to a pint, and requiring the patient to take the whole of this pint during the twenty-four hours. It was alleged that a perfect cure could be effected in the space of ten days usually, by the use of this remedy alone. My experience, however, failed to sustain these extraordinary claims for its specific virtues, but satisfied me that it possessed undoubted merits in both the acute and chronic forms of simple cystitis. This opinion I verified by the results of numerous cases treated with the broom corn at that time. Owing in part to the exciting events and disorganizing influences at work in Washington immediately preceding the war, I failed to preserve any record of these cases. Within the past year I have had repeated opportunities of testing the value of this

remedy in cystitis, and whilst it may not be necessary to give in detail a record of each individual case which has come under my observation during that period, I will here refer to two or three of the most recent, including those at present under treatment.

CASE I.—Mr. T., a gentleman forty-eight years of age, consulted me in January last, affected with a well-marked case of chronic cystitis from which he informed me he had been suffering at intervals for the last six years, resulting, he thinks, from an antecedent attack of gonorrhœa, or the treatment used for its cure. He has had stricture dating contemporaneously with the cystitis, for which he has been treated at long intervals by the introduction of various sized bougies. For the last year the stricture has given him very little trouble except at intervals dependent upon indiscretion in the use of wine or exposure to damp and wet weather. The painful and difficult micturition, however, had continued without much abatement, together with more or less tenderness on pressure over the bladder. An examination of the urine by Dr. G. N. Acker furnished the following results: sp. gr. 1021; reaction acid; numerous leucocytes; some blood-corpuscles; epithelium from bladder and urethra.

This gentleman has spent the greater part of his life in travel both in this country and in Europe, and has been under the care—for short periods—of several of the most skilful members of the medical profession. He possesses a nervous temperament, is irritable, self-willed, and unwilling to subordinate his own judgment to that of his medical attendant, refuses positively to submit to any instrumental examination of the urethra or bladder, and relies greatly upon his capacity to treat his own case. At the time he came under my observation, he was using simply an infusion of dog-grass which had been ordered for him by a physician whom he had consulted in New York.

After much persuasion, I prevailed upon him to try a decoction of the broom-corn seed prepared according to the formula given above. Of this he took during the day one pint, using at night a suppository containing ext. belladonnæ gr. $\frac{1}{3}$, Morphine sulph. gr. $\frac{1}{4}$. This treatment he pursued by special agreement between us, for five consecutive days and nights, when he was compelled to acknowledge himself greatly relieved, and consented without further solicitation on my part to continue the use of the decoction as long as he experienced any benefit therefrom, or as I thought it advisable for him to do so. At the expiration of three weeks he had so far improved as to micturate without pain, go out on long walks, with improved appetite and capacity to sleep, and expressed himself as feeling better than he had done for many months. Whilst he had been kept upon the maximum quantity of the decoction, the suppositories after the first few days had only been used twice a week, being held in reserve for future use as the urgency of the symptoms might demand. I occasionally saw this gentleman for two months; learned that he was still using the broom seed tea in smaller quantities, being fully impressed with its beneficial effects in his case, and confidently predicting his ultimate recovery by its use.

CASE II.—The second case is that of a Mrs. S., a woman about 28 years of age, in good condition and healthy appearance. Has suffered with cystitis for the last three years, attended with aggravations more or less severe, resulting from accidental causes. I could obtain but a meagre history of this case, owing to the fact that she had not, until the last

twelve months, given her case much attention, and had not up to that time put herself under the care of any physician. At the time she came under my treatment, she was suffering with great irritability of the bladder and intolerance of urine, requiring constant and painful efforts to expel it. Appetite and sleep impaired. Supra-pubic and intra-vaginal pressure against the bladder occasioned much pain. Chemical and microscopical examination of the urine showed the following: Dark yellow colour; sp. gr. 1027; reaction very acid; heavy sediment consisting of urates, mucus, muco-pus, and epithelium from bladder and vagina.

An exploration of the bladder with a steel sound satisfied me that it contained no calculi, and that this was a simple case of cystitis of long standing. Without going into details, it is sufficient to state that the treatment consisted in daily washing out the bladder with tepid water; the application of hot water bags to the pubic region; an anodyne suppository every other night for two weeks, and the free use of the decoction of broom-corn seed. She has now been under treatment for three months, steadily improving, all other remedies having been suspended for the past four weeks except the decoction; the urgent symptoms of frequent micturition and pain having almost disappeared. It is proper for me to add as corroborative testimony in favour of the broom-corn in this case, that on more than one occasion, when the decoction was suspended for several days in consequence of her inability to procure the seed, the unpleasant symptoms became aggravated. She is still under observation, and faithfully and hopefully adhering to the treatment.

CASE III. is that of a married lady, 36 years of age; has never borne children; possesses a nervous, excitable temperament; has been suffering with cystitis for eighteen months; symptoms at no time very urgent; more or less incontinence of urine. Microscopical examination confirmed the diagnosis.

Came under my care during the latter part of January last. Seems to suffer more from nervous irritability, manifesting itself in what she calls the fidgets and insomnia. Says she feels constantly like jumping out of the window; evidently some hysterical complication. Examination of the pelvic viscera discloses no uterine disease or displacement, but positive evidence of cystitis. Before consulting me she had been under the treatment of several physicians, including a homœopath, and had used most of the diuretics generally employed in such cases—particularly the infusion of *uva ursi*—deriving in some instances temporary benefit only. Irrigation of the bladder with tepid water was ordered to be used every other day. The decoction of the broom-corn seed, a pint daily, containing potass. bromid. ʒj, and an anodyne suppository at night, rest in bed, and abstinence from all stimulating drinks and diet, were enjoined. Under this treatment she immediately began to improve, and after a few days the bromide was discontinued, and the suppositories introduced every other night. She continued to practise the irrigations for two months, at the same time using the decoction as a drink, and observing the general hygienic directions given at the commencement of her case. Since the first of April I have occasionally seen this lady, who informed me a few days since that she has discontinued all treatment for the past few weeks, and considers herself cured.

CASE IV. is that of a gentleman, 50 years of age, suffering with all the symptoms of cystitis, associated with a stricture at the membranous portion of the urethra, the consequence he thinks of a former gonorrhœa.

Symptoms are those usually met with, and described in Case I. Has been affected for a year or more, but subjected to no medical treatment until he consulted me about three weeks since. Microscopical examination gave about the same results as in the other cases—mucus, muco-pus, and bladder epithelium in large quantities.

The symptoms in this man's case have not been of such a severe character as would compel him to take to his bed, or confine himself to his house, until I was sent for. For four days he was kept in bed with hot applications over the bladder, an anodyne suppository at night, and a pint of the decoction of broom-corn seed ordered to be taken daily. Owing, however, to the nausea produced by the decoction, I have been compelled to use it in smaller quantities, as I have been able as yet to procure no better preparation of the seed. For the last two weeks he has been permitted to go out to attend to business, having manifestly improved in every particular. He recognizes and appreciates his improved condition, and feels fully satisfied that his relief is due to the effects of the medicine. This case is still under observation and treatment. Interference with the stricture has been postponed until further general and local improvement.

Some objection may be urged against the particular form adopted for the administration of the remedy in the above cases. It will very possibly occur to most practitioners that any substance given in such large doses would be a serious obstacle to its use, as nausea would in most cases be likely to ensue. Such, however, has not been my experience with its use in that form. I have preferred this primitive mode of employing this remedy, because in preparing the decoction the seeds alone are employed, and as these are supposed to contain a larger proportion of the active principles upon which its therapeutic virtues depend than any other portion of the plant, we may naturally expect to obtain more positive results. It is not to be denied, however, that a fluid extract prepared from the seeds would be a much more popular, and, perhaps, an equally efficacious mode of administration.

I shall offer no theory regarding the physiological action of this remedy. Not having, as yet, been able to procure the necessary analysis to determine its proximate principles, I am not prepared to say in what particular constituent element resides its therapeutic virtues. It may simply be due to the large amount of mucilage contained in the kernel or seed proper, to some combination of the phosphorus found in the epidermis or rind of the seed, or belonging, as it does, to the same family with the sugar cane, it may possess in different combination, some of the principles of saccharine matter, which, associated with the above, might as a whole constitute its medicinal power. Whilst it manifestly relieved the disease, I observed no decided augmentation in the quantity of urine expelled.

ARTICLE XX.

CASE OF SEVERE INJURY OF THE BRAIN, WITH RECOVERY. By WILLIAM WOOD, M.D., of East Windsor Hill, Connecticut.

THURSDAY, May 29, 1880, I was summoned early in the morning to act as juror in a coroner's inquest on a man run over by the cars. On arriving at the depot where the body was brought, I found a well-dressed gentleman lying on the platform with his head cut open from the inner canthus of the left eye to the occiput. The brain was exposed, and a furrow some three inches in length was cut through the anterior portion of it. The left eye was turned up so that the pupil was not visible. On the opposite side of the head was a scalp wound three and one half inches in length. The conductor of the train informed me that the man was lying *beside* the track, and that his head was struck by the pilot of the engine. On looking at the cut in the brain I could discover slight pulsation, and there was some effort at respiration, but quite irregular. I immediately sent to my office for my surgical instruments, and after shaving the scalp, I introduced my fingers inside of his skull and removed some small spicula of bone, hair, and detached portions of the brain. I placed the eye in its normal position, and adjusted the scalp, taking some ten or twelve stitches, leaving a small opening at the inner canthus. I then applied a bandage over and around his head, drawing the bones into as close proximity as possible. During the whole operation he remained perfectly quiet and unconscious. He was removed into a neighbouring house, and I left, not expecting to see him living on my return. About 1 o'clock a messenger came for me, saying that he was vomiting blood. I found him with a tolerably full, intermitting pulse—ordered cold applications to the head, and counter-irritation over the region of the stomach. No visitors were allowed, and all noise about the premises was strictly forbidden.

Thursday night, passed water involuntarily; the vomiting of blood continued through Thursday, Friday, and Saturday, at intervals.

Friday and Saturday was very restless, requiring the constant care of two watchers to keep him on the bed.

June 1. Was more quiet.

2d. Partially conscious; removed stitches about the forehead and eyes; found union by first intention.

4th. Was rational, removed the remaining stitches, found perfect union the whole length, except at the angle of the eye, which was left open for drainage in case he should survive; measured the cicatrix, found it eight and one-half inches in length; the opening in the skull was the same as in the scalp.

5th. The tenth day after the accident, the discharge ceased, followed by the closing of the aperture; sat up one hour.

8th. Was dressed and walked out of doors.

11th. Rode out.

12th. The seventeenth day after the accident, rode to his boarding-house, some three miles distant.

21st. Resumed his work in the mill; twenty-sixth day since the injury.

The following facts I elicited from him: His name was Robert C. Chapman, a native of Glasgow, Scotland; thirty-two years old; was a machinist in a paper-mill in South Windsor. The mill had been running night and day for some time, and he had been in it six weeks prior to

this time, eighteen hours a day. The night previous to this accident he left the mill at 10½ o'clock P. M., and walked up the railroad track with two comrades to the hotel, at East Windsor Hill, and called for supper. After remaining for a time, they left for the mill; C. started back on the railroad track, as it was nearer, but his companions preferred to go by the highway. Overcome by sleep, he sat down near the track, which was the last he remembers prior to the accident.

The health of this young man has been good since his recovery; no trouble about his head; mind perfectly clear. He sees objects out of his injured eye, above or on a level with his eye, perfectly well, but has not the power to look down while holding his head erect. To test his vision, I blindfolded his uninjured eye, and gave him a letter which he read accurately and without hesitation.

There is evidently bony union over the posterior half of the injury. The interior portion over the frontal bone looks equally well, but upon pressure the bones appear to be separated about one-fourth of an inch.

As there was nothing unusual in the treatment of this case, I have omitted details. Cold applications were constantly applied to the head for the first week. I report this simply as one of the remarkable and exceptional cases of rapid and perfect recovery from an injury which, to all human calculations, must be fatal.

The blood vomited on the first, second, and third days after the accident no doubt came from his head, as his body was uninjured. The position in which I first found him makes the case plain. He was lying on his back with his head slightly elevated and mouth open.

ARTICLE XXI.

BENZOIC ACID IN THE ALBUMINURIA OF PREGNANCY AND SCARLATINA.

By W. SCOTT HILL, M.D., of Augusta, Maine.

THE presence of albumen in the urine of pregnant women and in urine after scarlatina, is always considered a dangerous symptom when occurring as a pathological condition. The pathology of such conditions is too well known to require mention. The property of benzoic acid to cause its rapid disappearance is not mentioned in any text-book on materia medica with which I am acquainted. The following cases in which it seemed to have that effect occurred in my practice:—

CASE I.—A lady, about thirty years of age, applied for treatment for anasarca. She was in the sixth month of her pregnancy. Had miscarried twice. There is anasarca of the whole surface. The face, hands, and feet very much bloated. Does not notice any difference in her size in the morning. Is usually in delicate health; is always anæmic. In both of her pregnancies before this there was the same anasarcaous condition as in this. The anasarca has existed some six weeks. She now finds it difficult to walk. The abdomen is much enlarged, giving her the appearance of being in the ninth month of pregnancy. The abdomen evidently contains an unnatural quantity of liquid for her term. Some nausea

and dull feeling in her head. Urine scanty, sp. gr. 1030; tested with nitric acid and by boiling and allowed to settle, it contained one-half albumen. Acid. benz. gr. ij with sod. borat. gr. iij, was prescribed to be taken every four hours. A few days afterwards another examination of the urine was made as before, and only a small quantity of albumen was found. The same medicine was continued; at the expiration of six days from commencing to take the medicine another test for albumen was made, but not a trace found. The anasarca decreased, but did not disappear. It may be proper to state that the patient miscarried a month later. The miscarriage appeared to be caused by dropsy of the amnion.

CASE II.—Was that of a woman in the sixth month of pregnancy. No notes were made of this case, but the conditions and treatment were similar to the first with the same result. I did not have an opportunity of testing the urine subsequently in either case, and do not know whether the albumen reappeared.

CASE III.—A girl twelve years of age applied, April 26, 1879, for treatment for anasarca. She stated that early in the winter she had what a physician called scarlatina, but was not much sick, and had not been in good health since that time. First noticed the bloating of the hands and feet a few weeks after the disappearance of the rash. This had continued to increase until the present time. She had taken a medicine containing iron, but without benefit. Her urine was examined with the microscope, and casts were found; tested by heat and with nitric acid it deposited five-sixths albumen. Passes less than the usual quantity. Her stomach is irritable and rejects what is not palatable. The anasarca is very marked, her face being bloated so that she is hardly recognizable. Acid. benz. gr. one-tenth, with potass. bitart. gr. one-half, was prescribed to be taken every 2 hours. Three days after the urine was again tested, and about half the quantity of albumen deposited. She was now given one-tenth grain doses of the acid, and the urine again tested at the expiration of four days, and found to be free from albumen. There was a slight decrease of the anasarca. The patient continued to fail, and died from pulmonary œdema ten days after commencing the treatment.

CASE IV.—A boy six years of age had a mild scarlatina, for which he received some treatment by a physician. Two weeks after the subsidence of the rash his urine began to be scanty, and œdema of his face and extremities was noticed. When called to see him there was a moderate anasarca, more of the face than any other part. Some swelling of the cervical glands. He is thirsty at night; tongue coated on edges, red in the middle; urine scanty, sp. gr. 1020; no casts; deposits a small quantity of albumen on being tested with heat and acid. Acid. benzoic. in small and frequently repeated doses was prescribed. The albumen disappeared as in the other cases, and the boy made a good recovery. No other medicine was given.

In the first three cases there is no reason to suppose the albumen would have ceased to be secreted had they not been treated. The case of the little girl, which was undoubtedly a fatal form of Bright's disease, would seem to show that benzoic acid has the effect of preventing albumen passing into the urine. The little boy would perhaps have recovered without any treatment. The smaller doses of benzoic acid seemed to be as efficacious as the large ones.

REVIEWS.

ART. XXII.—*A Treatise on Bright's Disease and Diabetes, with especial reference to Pathology and Therapeutics.* By JAMES TYSON, A.M., M.D., Professor of General Pathology and Morbid Anatomy in the University of Pennsylvania, etc. *Including a Section on Retinitis in Bright's Disease.* By WILLIAM F. NORRIS, A.M., M.D., Clinical Professor of Ophthalmology in the University of Pennsylvania. 8vo. pp. 312. Philadelphia: Lindsay and Blakiston, 1881.

IN his preface the author says, "that, for more than fifteen years, his thoughts, his studies, and his practical work have all been in the direction suggested by these subjects, and that during that time material has passed under his observation which ought at least, if properly used, to have resulted in an experience which should be useful to others." Dr. Tyson has presented his subjects so clearly and concisely, and has selected his material with such sound judgment, that his work cannot fail to be useful to practitioners and students. His aim evidently has been to give in compact form the essential facts, rather than to furnish an exhaustive treatise burdened with discussion of disputed points. The work is provided with two coloured plates, and with thirty-six wood-cuts, which are devoted for the most part to the structure of the normal kidney and to the appearances of casts.

The first chapter contains a concise and excellent description of the *structure of the normal kidney*. The results of the important researches of Heidenhain, Schachowa, and Langhans are given. Klein's divisions of the uriniferous tubule are adopted. If the recent observations of Ribbert are confirmed, it will be necessary to modify the statement as to the existence of nuclei in the capillary walls of the glomeruli. The first chapter also includes some suggestions as to the methods of preparing the kidney for microscopical study, and a brief consideration of the theories regarding the process of secretion of the urine. In respect of the latter the view accepted is that of Bowman as elucidated by the experiments of Heidenhain.

The second chapter is devoted to the *methods of testing for albumen*, and to a consideration of the *sources and of the mechanism of production of albuminuria*. As was to be expected from the author's experience, his directions for detecting albumen in the urine are eminently simple and practical. He justly condemns the careless, but common, habit of designating by percentages the amount of albumen estimated, in the usual way, by observing the proportion between the albuminous precipitate and the bulk of urine tested. While speaking of pus in the urine as a source of albuminuria, the author calls attention to certain cases of vesical disease where with an insignificant quantity of pus there is an altogether disproportionate amount of albumen, although no evidences of renal disease exist. The least satisfactory part of this chapter is that which is taken up with the consideration of the mechanism of production of albuminuria. The author is evidently not cognizant of the experiments of Nussbaum, and

of Posner, when he states that the view which holds that albumen transudes through the capillaries of the glomerulus, is based only on theoretical grounds and not on demonstration. The theory adopted that the chief agency in the transudation of albumen in the kidney is increased blood-pressure in the capillaries has lost much of its basis by the experiments and critical analyses of Runeberg, Heidenhain, Cohnheim, Litten, and others, to whom the author does not refer in this connection. Alterations in the capillary walls are admitted as a cause of albuminuria "only in the more acute inflammatory conditions of the kidney."

In the third chapter the varieties, the nature, and the significance of *casts of the uriniferous tubules*, are ably discussed. Pale hyaline casts are considered to be produced by the coagulation of a fibrinous or albuminous exudation from the blood into the tubes. This view, which is by far the most probable one, has received welcome confirmation by the recent experiments of Ribbert, who has, moreover, demonstrated their albuminous nature in opposition to the conclusions of Axel Key and Rovida. Waxy casts, however, Dr. Tyson thinks, are probably produced by fusion and hyaline transformation of desquamated epithelium. He was able to confirm the observations of Bartels, and of Rindfleisch, that these casts exceptionally give the iodine reaction characterizing the amyloid change. He says that he has never found true casts in urine from healthy kidneys, although he is unwilling to deny the possibility of their occurrence under these circumstances. He has repeatedly had opportunity to confirm the fact that casts may remain in the urine for some time after albuminuria has disappeared.

In chapter fourth, after mentioning some of the different *classifications of Bright's disease*, the author gives his own classification, which is as follows: *acute parenchymatous nephritis, chronic parenchymatous nephritis, lardaceous disease, chronic interstitial nephritis, and cyanotic induration*. This is essentially the classification adopted by Bartels, whose authority is followed in the ensuing chapters perhaps more than that of any other writer. In the present state of uncertainty concerning what renal changes shall be included under the name Bright's disease, concerning the pathological anatomy of recognized forms of the disease, and concerning the groups of symptoms which characterize different varieties of the disease, it is easy enough to find fault with this as well as with any other classification ever suggested. The classification adopted by Dr. Tyson is a convenient and useful one, and in its main features is perhaps more generally accepted at present than any other. The propriety of including chronic passive congestion of the kidney under the heading of Bright's disease, is very doubtful. Cyanotic induration of the kidneys is not usually accompanied by important structural changes. We cannot forbear offering certain criticisms concerning the popular classification of Bright's disease adopted by Dr. Tyson. In the first place the whole doctrine of parenchymatous inflammation upon which it is based is not in harmony with the best views as to the nature of the inflammatory process. The swollen and clouded condition of cells designated as parenchymatous inflammation is also, and with more propriety, called parenchymatous degeneration, albuminous or granular degeneration, etc. While it may attend inflammation, it is also met with under circumstances where the inflammatory nature of the change is not to be thought of. We believe also that the most careful investigators are gradually reaching the conclusion that in the majority of cases of so-called parenchymatous nephritis,

whether acute or chronic, alterations in the glomeruli and in the interstitial tissue are present which it is wholly gratuitous to assert are unessential or merely secondary to changes in the epithelial cells. So marked is this tendency of recent investigations that Greenfield, in his *Résumé of the Present Knowledge of Renal Pathology* in 1879, regards as the only essentially parenchymatous form of Bright's disease, certain cases of non-scarlatinal acute nephritis which he admits are as yet imperfectly investigated and may hereafter be shown to be associated with other than purely parenchymatous changes. That a simple parenchymatous degeneration may occur in the kidney as well as in other organs cannot be denied, but there seems to be little ground, either from a clinical or from an anatomical point of view, for calling this change Bright's disease. With what propriety can we bring under the head of acute parenchymatous nephritis, those cases of scarlatinal nephritis in which there are marked changes in the glomeruli, and in the interstitial tissue, sometimes with and sometimes without parenchymatous degeneration of the epithelium of the tubes? What place in this scheme of classification shall we assign to Wagner's acute lymphomatous nephritis, or to Ribbert's glomerulo-nephritis with interstitial nephritis, forms of acute Bright's disease which undoubtedly exist?

Each of the forms of Bright's disease included in the above classification is considered in a separate chapter. This part of the book also includes a chapter on *suppurative interstitial nephritis*, and one on *retinitis in Bright's disease*, the latter by Dr. Norris.

For both *acute and chronic parenchymatous nephritis*, Dr. Tyson adopts the view so long and strenuously urged by George Johnson, that the primary and essential change is cloudy swelling of the epithelium of the convoluted tubes. Interstitial changes, if found at all, are secondary to the changes in the epithelium, and are not usually present in the early stages of the disease. "They consist in a hypernucleated overgrowth resulting from the proliferation of the connective-tissue corpuscles always present, or from the fixation of wandered-out colourless blood-cells, and are doubtless due to the long-continued hyperæmia." We are glad to see a full account, based upon Langhans's researches, of the alterations in the glomerulus and its capsule. The appearances interpreted by Langhans as referable to proliferation of the capillary nuclei are in reality due, according to Ribbert's recent studies, to the accumulation of white blood corpuscles and of an albuminous substance in the distended capillaries of the glomerulus. Chronic parenchymatous nephritis is divided into two stages: first, a stage of enlargement, or the large white kidney; second, a stage of atrophy, or the fatty and contracting kidney.

The symptoms of parenchymatous nephritis in its two forms are systematically and well described. After describing the symptoms usually produced by acute nephritis, mention is made of those interesting and rare cases of the disease without dropsy, as well as of the temporary absence, even in grave cases, of albuminuria and casts. In chronic parenchymatous nephritis, general dropsy is almost always present, accompanied by anæmia and debility. The urine in the first stage is diminished in quantity, of low specific gravity, contains a large quantity of albumen, and throws down a copious white sediment containing chiefly granular, fatty, and waxy casts, granular débris, free fatty cells, leucocytes, and occasionally red blood corpuscles. The normal constituents, particularly the urea, are diminished. Dr. Tyson's experience is opposed

to Bartel's statements, that at the height of the disease the specific gravity is above the normal, and that the quantity of albumen rises with the specific gravity. In the author's experience urines of low specific gravity contain the most albumen. Uræmia is rare in this form of nephritis, partly because, as Bartels had suggested, the physiological sources of urea are diminished by mal-assimilation and diminished tissue-waste, and partly because some of the urea may be stored in the dropsical fluid. The stage of atrophy is to be diagnosed by knowledge of the previous history, by hypertrophy of the left ventricle, by diminution of the dropsy, by increased quantity of urine and lessened amount of albumen. In distinction from the contracted kidney of interstitial nephritis, the quantity of urine is still within the normal, and contains more albumen, and larger, more numerous, and various casts than in the latter disease. Uræmia is still infrequent, but is rather more common than in the stage of enlargement. Retinal changes are less common than in interstitial nephritis. The prognosis is unfavourable as regards recovery, most cases terminating within two years, and sometimes within a few months. Over twenty pages are devoted to the treatment of acute and chronic parenchymatous nephritis. The therapeutical views inculcated are marked by good sense and sound judgment. In acute nephritis, rest, quietude, and warmth are to be maintained. If the urine is scanty, dry or wet cups and warm fomentations to the loins are to be employed. Purgatives are recommended, not only to secure a complemental act of secretion, but also to relieve congestion, and to promote the absorption and prompt action of other remedies. For diaphoretic effects, jaborandi or pilocarpine and warm baths or packs are to be employed. The infusion of digitalis, the salines, and diluent drinks are the best diuretics. Milk is the typical food; animal flesh should be avoided, because it increases the production of urea. Bleeding from the arm is recommended for the relief of uræmic coma and convulsions, if the patient is not too feeble. Excellent results sometimes follow the administration of chloral hydrate in convulsions. He cautions against the use of opium in uræmic convulsions, and believes that he has seen death accelerated by a dose of opium in itself insufficient to produce fatal results. In convalescence from acute Bright's disease, as well as in chronic Bright's disease, tonics should be employed. In chronic Bright's disease, the author has never succeeded in diminishing the quantity of albumen by tannic and gallic acids. He thinks that he has obtained some effect in this direction by the use of ergot. He has observed a diminution in the quantity of albumen under the use of sandalwood-oil, and recommends it for trial in cases of obstinate albuminuria. Fuchsin and rosanilin he has not tested.

Three stages of *lardaceous disease of the kidney* are distinguished: first, a stage of waxy degeneration confined to the glomeruli; second, one in which the degeneration has extended to the vasa recta and other bloodvessels, and possibly to the membranæ propriæ and even to the epithelial cells of the tubes; and third, a stage of atrophy. In the first stage there are no changes in the epithelial cells; in the second these may be fatty; in the third there is "hypernucleated intertubal overgrowth" as the author rather curiously expresses it. This division we believe to be essentially schematic and not based upon pathological observations. It is doubtful whether there is any form of waxy kidney of any clinical importance, where nephritic changes in the epithelial cells and in the interstitial tissue are absent. As regards the causes of this disease, it is to be noted

that the author, together with George Johnson, regards chronic albuminuria itself as a cause of waxy degeneration, and thus explains in certain cases the combination of chronic parenchymatous nephritis, with waxy disease of the kidney. In lardaceous renal disease, there is general dropsy, but this is rarely as extreme as in parenchymatous nephritis. The urine is increased in quantity, of low specific gravity, light in colour, loaded with albumen, and contains but few casts, these being chiefly hyaline and waxy; but in addition perhaps fatty casts and free fatty epithelium may be found. Uræmia is extremely rare, as the urea and ex-tractives are eliminated in sufficient amount to prevent this. Of capital importance in diagnosis is the previous history of the patient, and the recognition of coincident waxy enlargement of the liver and spleen, but even under these circumstances unusual difficulties may attend the diagnosis. The author does not emphasize sufficiently the considerable variation in symptoms which may be observed in different cases of waxy kidney. No mention is made of the cases of even extensive waxy disease of the kidneys without albuminuria which have been reported by Litten. Under treatment especial importance is very properly assigned to prophylactic measures.

Under the causes of *interstitial nephritis*, a remarkable example of the influence of heredity in the causation of Bright's disease is mentioned. In this instance, which came under the author's notice, it was determined that no less than eleven members of one family had been affected with the disease. A similar, although less striking, instance is known to the reviewer, and it is believed that more attention should be given to hereditary influence in the etiology of Bright's disease than has hitherto been the case. The influence of alcohol as a cause of Bright's disease, the author thinks, has been over-estimated. Although the parts of the work relating to the causation of the different forms of Bright's disease are reasonably full, yet we believe that their value would have been increased still further by the introduction of some of the results obtained by Bamberger's analysis of over 2000 cases in which a post-mortem examination was made in Vienna. The morbid changes observed in kidneys affected with chronic interstitial nephritis are well described. We can hardly understand, however, why so well known a fact as "the presence of an increased amount of fat surrounding the contracted kidney, even in emaciated subjects," should be mentioned as a recent discovery of Da Costa and Longstreth. Johnson's views as to the nature and cause of the cardio-vascular changes in this form of Bright's disease are, in the main, those adopted by the author. He admits, with Gull and Sutton, also an increase of the outer or fibrous coat of the arteries, but he dismisses very summarily the views of these writers as to the primary nature of the arterio-capillary fibrosis, and as to the cause of the hypertrophy of the heart. For the latter Johnson's "stopcock theory" is accepted. The observations and views of Da Costa and Longstreth relating to lesions of the renal ganglia and the cause of hypertrophy of the heart, are stated without criticism. The author cautions against mistaking senile atrophy of the kidneys for true interstitial nephritis, and thinks that Gull and Sutton have fallen into this error. The clinical history with all its insidious characters, the complications, the diagnosis, the prognosis, and the treatment of chronic interstitial nephritis, are handled with a full appreciation of the important contributions made to our knowledge of this disease within the last few years.

Dr. Norris's chapter on *retinitis in Bright's disease* is to be commended for its conciseness, and at the same time fulness as regards the essential points. It opens with a short historical introduction, and closes with a reference to treatises containing a full discussion of the subject.

The author regrets that he has no contributions to offer concerning the presence of bacteria in *suppurative interstitial nephritis*. This we also regret, for we believe that by proper methods their presence can be demonstrated in the majority, if not in all, of the cases of this disease in the early stages. This is one of the few diseases in which the pathogenetic influence of bacteria is easily demonstrable. The author's view, however, is that, "supposing the observations of Klebs and Ebstein to be correct, the question of the parasitic origin of pyelo-nephritis becomes only a part of that of the parasitic origin of disease generally, which, to say the most, must be considered, *not proven*." The author propounds the singular question: "How long can obstructed conditions of the ureter and pelvis of the kidney exist before producing suppurative nephritis?" His answer is that after three years, if not before, "the corresponding kidney or kidneys are probably the seat of suppurative nephritis." The obstructed conditions are of course not necessarily ever followed by suppurative nephritis, the former may exist for a long lifetime without the latter.

Cyanotic induration of the kidney is regarded as a form of interstitial nephritis without marked lobulation of the surface, and with less interstitial new-growth than in the cirrhotic kidney. The process is "in the main one of simple hypernutrition resulting from a copious access of pabulum." Inasmuch as the affected kidney receives less than the normal quantum of arterial blood, this explanation cannot be considered a very fortunate one. While there is no doubt that chronic interstitial nephritis may accompany valvular disease of the heart, and doubtless in some cases be a result of the latter, we do not believe that anatomical investigations sustain Dr. Tyson's position that the ordinary cases of cyanotic induration are examples of interstitial nephritis. The symptoms are those usually described as attending cardiac disease with chronic passive congestion of the kidneys.

The last eighty-four pages of the book are devoted to the consideration of diabetes mellitus and diabetes insipidus. Dr. Tyson's account of *diabetes mellitus* is admirable in all respects. He gives fully the different theories as to the pathogenesis of the disease. For the sake of completeness Huppert's theory advocated by Pettenkofer and Voit, might have been added to the chaotic mass. Excepting Ebstein's observations on renal changes, all that is known of the pathological anatomy of diabetes mellitus is presented. Under causation the author notes the rather frequent occurrence of the disease in physicians engaged in laborious practice. Although he has no especially novel views to offer concerning the symptoms and the treatment, his consideration of these subjects is so systematically arranged and so full of practical suggestions that it will be a most useful guide to practitioners. The theories concerning the cause of diabetic coma are briefly mentioned but not criticized. A description of the appearance of the fundus oculi, called by Dr. Heyl intraocular lipæmia, is introduced, and the condition is illustrated by a coloured lithograph in the frontispiece. Dr. Tyson naturally gives the first place to the dietetic and hygienic management of the disease, and here his suggestions will be found to be in accordance with the results of the best experience and physiological experiments. A convenient summary

of articles of food suitable for diabetics is introduced. From the medicinal treatment may be selected, the recommendation of ergot as a useful and rationally indicated drug.

Diabetes insipidus is believed by the author to be the result of some irritation, either direct or reflex, of a centre in the medulla oblongata above the diabetic centre, or of the sympathetic ganglia in the abdomen. "The immediate cause is a dilatation, first, of the arterioles, and then of the capillary bloodvessels of the kidney, through whose thinned and stretched walls, the water osmotes readily," although the possibility of an excito-secretory influence exerted upon the gland-cells of the kidney, as suggested by Eckhard, is admitted. As regards prognosis, "recovery is almost as infrequent as death." Among the therapeutical measures which the author mentions are the use of ergot, blisters at the nape of the neck, and the constant galvanic current. In general the supply of water should not be limited.

Dr. Tyson's treatise we believe has been prepared with great care. It is a clear and valuable presentation of the subjects of which it treats.

W. H. W.

ART. XXIII.—*Osteotomy, with an Inquiry into the Etiology and Pathology of Knock-knee, Bow-leg, and other Osseous Deformities of the Lower Limbs.* By WILLIAM MACEWEN, M.D., Surgeon and Lecturer on Clinical Surgery, Glasgow Royal Infirmary. 8vo. pp. xvi., 181. London: J. & A. Churchill, 1880.

THIS book is worthy of the closest study by surgeons. It deals with a subject in which great advances have been made of late years. It is the work of a gentleman who has made valuable contributions to its literature, of one who evidently writes from an experimental knowledge of the matter.

Dr. Macewen, and it is a great pleasure to an American to be able to speak of so good a surgeon as doctor, writes in a singularly simple and unpretentious way, which makes the reader feel as if he was being talked to, and at once brings him into close sympathy with the writer. Yet the very straightforwardness of the author has apparently prevented his bestowing that care upon his style, by which alone, in the absence of extended practice in writing, perfect clearness of expression can be secured. For this reason, and from the importance of the details of the subject, the book is one not to be lightly skimmed, but rather to be carefully read, and sometimes pondered over, if the teachings of its writer would be thoroughly understood.

The first chapter is devoted to a consideration of the etiology of those curvatures in bone which generally make a resort to osteotomy necessary, and Dr. Macewen does not hesitate to declare that they are traceable to rickets—thinking, as he does, that, from some cases which have occurred within his own observation, he is justified in extending the definition of rachitis to the disease established after the years of childhood.

Our author thinks that while rachitis is not generally hereditary, it is so in some cases, and that, contrary to the received opinion, the disease is sometimes derived from the father. This last fact he thinks is supported

by two cases he has himself observed, and which he narrates. Although the condition of the mother during utero-gestation exerts a most powerful influence upon her offspring, and her enfeebled condition during that period may be the cause of rickets, yet our author does not think that rachitis can be regarded as hereditary in the same sense that struma and phthisis are. It is this fact of the impoverished condition of the maternal system that, in Dr. Macewen's opinion, accounts for the often repeated observation that in large families, it is the children of later birth who suffer most from rickets. As has been already indicated, our author is well convinced that epidemic diseases, in the enfeebled conditions which often result therefrom, are quite sufficient to cause the development of rickets long after birth. He does not think that this well-established sequence can be accounted for by the suggestion that acute rachitis may have been mistaken for one of the exanthemata, as the cases of this kind coming under his observation have been under the care of practitioners too widely separated to make the supposition a likely one. Any disease or injury which produces the necessary enfeeblement may have rachitis among its true sequelæ, while poor food, unfavourable hygienic surroundings, and especially bad air, are fruitful sources of the evil. The absence of earthy salts from a very pure water cannot be proved to have any such effect as has been often attributed to it. Dr. Macewen concludes that very rarely rickets depends upon heredity, but that very generally it is traceable to mal-nutrition of sufficient extent and sufficient duration.

Chapter II. treats of the age at which rickets may make its appearance, and it is shown that, though most common in very early life, it is by no means confined to that period, but may appear at any time during the period of growth; while the effects are more marked the earlier the disease has made its appearance.

Chapter III. is concerned with certain of the effects of rickets, which acting principally upon the osseous system especially concern surgeons. These changes are essentially dependent upon an excessive preparation for ossification, with an arrest of that process. There is "merely a change in the quantity and arrangement of normal structures and secretions" (Jenner), and the structure, which should normally harden into bone, continuing cartilaginous accounts for the swelling and distortion which ensue. When the disease is stayed, ossification or calcification takes place, and eburnated bone is the result. Our author thinks it very important to keep in mind the facts that only one part of the skeleton may be much affected, that the degree may be very varied, and that the softening in the shaft of a long bone may be not at all proportionate to the enlargement which exists at the ends of the bones.

Dr. Macewen thinks that in every case the bending of bone which accompanies rickets is produced, not by muscular action, but rather by the superimposed weight of the body. Indeed, so general is this law, that, although the diagnostic enlargement of the ends of the bones is so frequently seen, in but three cases has our author observed bending in the upper extremity, and in every one of these exceptional cases the cause could be distinctly traced to the fact of the extremity having been used to support the weight of the body while the bones were unequally developed by the existence of rickets.

Genu valgum is considered at some length. We have not space to follow Dr. Macewen through his careful study of this deformity, but extract for the benefit of our readers his *résumé*, which is as follows:—

"Genu valgum is an osseous deformity of the lower extremity, consisting, as a rule, of more than one element. The most constant factor is an inward curve of the lower third of the femur, which lowers the level of the internal and raises that of the external condyle. The second factor is an abnormal elongation of the internal condyle, which is frequently found and generally associated with the inward curve of the lower third of the femur. These, separately or combined, form the chief pathological anatomical features in knock-knee. There is another element found in about one-third of the whole number of cases, consisting of an increase of osseous matter on the inner side of the tibial diaphysis at its proximal extremity, which causes the head to sit askew on the shaft. This tibial deformity, when present, is so to a small extent, though in a few it forms a prominent feature. In some cases a somewhat similar osseous increase is found on the inner side of the epiphysal junction."

After a short consideration of genu varum, Dr. Macewen goes on to the main part of his subject, namely, osteotomy as practised for the relief of these deformities. After giving due credit to Dr. Barton, of Philadelphia, for the operation performed by him, the subject of operative proceedings is historically considered down to the time it was first performed antiseptically by Volkmann of Halle, who published his first two cases in March, 1875. In April of the same year Dr. Macewen made his first antiseptic osteotomy, and he says it "has been greatly extended, and it has met with such success as to insure it a permanent place as a safe, certain, and most successful procedure." It is certainly one of that growing number of serious operations which by the increased success which attends their performance under the methods introduced by Mr. Lister, have shed lustre upon his name.

A very careful description is given of the chisels and osteotomes which Dr. Macewen has devised, and proved to be efficient. The chisel has the bevel upon one side, as in the ordinary instrument in use among carpenters, while the "osteotome" is bevelled on both sides, the bevel being continued from the edge to the handle. Particular care is bestowed upon the temper of these instrument, that, on the one hand, they shall not be so hard as to involve risk of breaking, or, on the other, so soft as to turn or curl when brought into contact with bone. Dr. Macewen gives such descriptions of the tempering necessary as ought to enable any instrument-maker to make them successfully, and suggests that the correct temper should be proved by trial upon a fresh ox bone.

In performing osteotomy, after the administration of an anæsthetic, the limb to be operated upon should be rendered bloodless by the application of an Esmarch bandage and supported upon a sand pillow to afford firmness and the necessary resistance. Dr. Macewen thinks the incision should be as direct as possible, and parallel to the course of the muscular fibres, if practicable. The bistoury with which the incision is made through the soft parts down to the bone, should be retained in situ until it has served as a guide for the introduction of the osteotome. This incision should be made at one stroke, and need not be more than from one-half to one inch in length, and as it may not and probably will not correspond to the direction in which the osteotome is to act, it should if possible not penetrate the periosteum, and when this variation in the line of action exists, the osteotome or chisel should be so manipulated as to avoid scraping off a portion of periosteum. Care is to be exercised that from muscular contraction, the incision is not made of greater length than is necessary, and to avoid this error, as also a want of correspondence between the wound in the muscle and that in the skin, the bistoury should

be used with deliberation as well as firmness. The beginner is advised, however, to make a larger incision rather than one which from his lack of experience may be too small. We cannot follow our author through the detailed directions for the use of the osteotome or chisel, but must refer the reader to the book itself, where he will find the matter treated with admirably concise minuteness.

With Chapter X. begins the consideration of special osteotomies, it being concerned with the hip-joint. The risk of forcible rupture in cases of bony ankylosis of this joint is pointed out, and osteotomy recommended as the safer expedient. One case is given in which osteotomy was resorted to most successfully. An incision an inch and a half long was made down to the neck of the femur, and the condition of the parts thoroughly examined with the finger. Firm osseous union of the head of the bone with the ilium being thus made out, the neck of the femur was divided by an osteotome, and the limb straightened. All this was done under the spray and full antiseptic precautions, and was followed by union and cure in about one month. Dr. Macewen deems this method preferable to the subcutaneous procedure without antiseptics, although Messrs. Adams and Gant have had considerable success by that mode of operating.

Chapter XI. deals with the operations rendered necessary by osseous ankylosis of the knee in a vicious position. Generally a division of the femur is sufficient, but the surgeon is sometimes required to supplement this operation by a division of the tibia. Dr. Macewen has operated successfully without suppuration in six cases, in only one of which did he have to make a section of the tibia.

In Chapter XII. the subject of knock-knee is considered, with the various devices which have been resorted to in the attempt to remedy this deformity by other means than osteotomy. Dr. Macewen thinks that sections of either tendons or ligaments are rarely followed by good results, while they are sometimes attended by very unfortunate ones, such as a loose joint, or paralysis from injury to nervous structures. He also condemns the forcible straightening of the extremity, as very uncertain in results, very unscientific in method, and fully equal in risk to an antiseptic osteotomy. This latter operation as applied to the knee-joint forms the subject of the following five chapters—indeed it is the central point of the volume. Ogston's operation, which consists of separating the internal condyle of the femur, is not considered satisfactory, for the reason that it opens the joint, and when the limb is straightened, the condyle being pushed up, there is a sharp edge of bone left projecting into the articulation. Various modifications of Ogston's brilliant operation, which Dr. Macewen regards as a true stroke of genius, have been devised, looking to a partial separation of the condyle without entering the joint at the operation, but they are all open to the objection that when the narrow bridge of bone by which the condyle is left united to the femur is bent or broken, which must take place when the limb is straightened, and without which the necessary displacement cannot be obtained, the integrity of the joint must be impaired. Then in practice it is difficult to make the section through the condyle with such precision as not to enter the joint, while experience shows that the pathological deformity is not limited to the elongation of the condyle, but includes as well a bending inwards of the lower third of the femur. It is admitted that very good results have followed Ogston's operation, but there have been some bad ones, and Dr. Macewen thinks the injury inflicted is so severe that it is not wise to

unnecessarily call upon the bounty of nature to make the repair which the simpler and more effectual operation of supra-condyloid osteotomy, which he has introduced, does not require.

In some cases Dr. Macewen thinks it may be advisable to divide the tibia after the operation has been done upon the femur, yet this is seldom the case, and with increasing experience is but rarely resorted to by him. He has never found it necessary to meddle with the fibula. This opinion is in opposition to Mr. Barwell's view, but it is one in which most of those who have paid attention to the subject, and have had practical experience in the matter, are inclined to side with the Scotch surgeon.

Chapter XV. is occupied with the anatomical relations of the parts involved in, and the rationale of, Dr. Macewen's operation. This consists of a simple transverse section of the femur a finger's breadth above the upper part of the external condyle. This line carries the section entirely above the epiphysis, being made from the inside and from behind it will not reach the synovial pouch prolonged beneath the tendon of the quadriceps extensor, the nearest point of the joint, which is thus preserved intact with all its strengthening ligaments. The incision in the soft parts passes above the superior articular artery and below the anastomotica magna. This incision is made "on the inner side of the limb, at a point where the two following lines bisect one another: a line drawn a finger-breadth above the level of the upper border of the external condyle, and a line drawn parallel to, and half an inch in front of the tendon of the adductor magnus," and is made in the longitudinal direction from one-half to one inch long. In making the section of the femur Dr. Macewen recommends the use of two or three osteotomes, beginning with the coarsest, so that those afterwards used may not be bound by the lateral pressure. It is important to follow the line given, as if a lower one is followed, the hard and dense structure of the external condyle being impinged upon will give trouble, and it should be borne in mind that the external antero-posterior diameter is greater than the internal. Keeping these two points in view, there should be no difficulty in making the section through at least two-thirds of the thickness of the bone. The remaining third is either broken or bent by the act of straightening the limb, and this last step does not sever the periosteum on the inner side, an important advantage. The only interference with tendons which Dr. Macewen thinks it wise or necessary often to make, after this supra-condyloid osteotomy, is in aggravated cases to divide that of the biceps, and he is of the opinion that to do this affords fully as much rectification of the line of the limb as that obtained by dividing the tibia.

The wound is of course dressed antiseptically, and the limb placed in a long splint extending up to the side of the body. Dr. Macewen lays stress upon the importance of paying special attention to the circulation, and thinks that the surgeon should not feel satisfied that the dressing is not too tight unless the patient is able to move the toes freely soon after its application. In the after-treatment the thermometer furnishes the principal guide upon which reliance must be placed. When this instrument indicates a temperature below 101° for the first two days, and below 100° during the first two weeks, everything may be regarded as going on well, but any elevation of temperature which cannot be accounted for otherwise should lead to an examination of the dressing, and the same course should be pursued if any stain of blood makes its appearance.

It has been proposed to modify this supra-condyloid operation by making the incision from the outer aspect of the limb, but Dr. Macewen entirely

disapproves of this, and we think the reasons he adduces for his opinion are conclusive. .

For genu varum or bow-leg Dr. Macewen advises the same supra-condyloid osteotomy, supplemented, however, by such division of tibia and fibula as the particular case may make requisite. These multiple osteotomies our author is in the habit of doing at the same time. In fact Dr. Macewen has got to regard osteotomy with antiseptic precautions, as hardly a dangerous measure, and his experience seems to warrant his conclusion.

Chapter XIX. treats of anterior tibial curves, and their treatment either by a simple osteotomy or by the removal of a wedge of bone, while Chapter XX. speaks briefly of splints. From Chapter XXI. and last may be gleaned several items of interest. In it we learn that Dr. Macewen has done 835 osteotomies on 557 limbs, belonging to 330 patients. These operations have been by open wounds, and were not subcutaneous, having really been of the nature of compound fractures. While at first only the robust were operated upon, latterly many of the feeble and weakly have been submitted to osteotomy, until at last no cases were refused whose bones were in a proper condition, that is, not soft, or in a stage of ramollissement. With the exception of eight cases all the wounds healed by organization of blood-clot without pus production, and in seven of the eight there was a distinct cause, connected either with the operation or the dressing, to account for the unusual event. In only one was amputation required for gangrene, produced by the patient getting out of bed and twisting the limb in the absence of the nurse. But three deaths occurred: one from pneumonia, contracted prior to the operation, one from tubercular meningitis, and one from diphtheria. Dr. Macewen defends the use of the term "organization of blood-clot" and gives illustrations of the microscopical appearances in the only recent case in which he was enabled to make a post-mortem examination. Dr. Foulis, who made the examination, styles the cells which are formed within the clot—

"granulation cells, for they in no way differ from those seen in antiseptic granulating wounds selected for careful comparison, and whether they were derived from leucocytes, or also, as I think, from a cell growth in the tissues as well, the picture is still one of a wound healing by granulations, though without suppuration. It would seem that the production of granulations is kept down to the minimum in perfectly antiseptic wounds; the fate of the blood-clot is to be absorbed in a passive manner." Dr. Macewen concludes that the "healing open wound by organization of blood-clot is the safest, quickest, and best."

We have sufficiently expressed our opinion of the value of this book. Its appearance of candour and fairness must commend it to every one who studies it, and it is based upon such an amount of experience as entitles the conclusions of its author to most respectful consideration. No one will read far into it without seeing that the author's object has not been to make a book, but that he has written because he has something to say. He has said it well, and the profession is a gainer by what Dr. Macewen has written. There are very many new books, but it is our fortune to meet with few that are like this one, a fair statement of original work and accurate observation, and therefore of great value.

S. A.

ART. XXIV.—*Bovine Tuberculosis in Man; an Account of the Pathology of Suspected Cases.* By CHARLES CREIGHTON, M.D., M.A., Cantab., Demonstrator of Anatomy in the University of Cambridge. 8vo. pp. xi., 119. London: Macmillan & Co., 1881.

IN this book the author hopes to show that certain cases of tuberculosis in man can be proved by their morphological characters to have been derived from the tuberculosis of cattle. His attention was directed to the subject by the peculiar appearances presented in twelve cases which occurred at Addenbrooke's Hospital, Cambridge, England, following closely one after the other. For these cases, he cannot point out any definite source of infection, nor has he attempted to reproduce the disease in animals by experiment, but relies solely upon the specific and distinctive characters of the tuberculosis that affects the bovine species and the morphological identity which he will prove between that kind of tuberculosis and the disease that occurred in the group of twelve cases in man. As a basis of what he is about to prove, he regards the "structural mimicry that resides in infection" as of the first importance. He believes in the specific character of bovine tuberculosis, and mentions the various popular names of the disease: Meerlinsigkeit, Ger. (duckweed disease); Perl-sucht, Ger. (pearly disease); pommelière, Fr. (potato disease); angle-berries, Scotland; grapes, England; which, although differing among themselves, always refer to the peculiar growths upon the serous surfaces as characteristic. This is the substance of the first chapter, which, together with the whole book, could have been very much shortened without injuring his case, by a careful revision, especially in the matter of repetition of what has been once stated.

Chapter II. gives a "summary of the pathological anatomy of tuberculosis in the bovine species." The first point to which he calls attention is the change to be observed in the serous membranes. He quotes from Walley to show that in the early stages there is a diffuse and extensive capillary congestion, followed rapidly by the formation of innumerable minute, villous-like, vascular processes, giving to the membrane an appearance closely resembling the pile on red velvet. In the course of time the extreme vascularity of these little processes passes off, and they assume a definite shape and become converted into small, hard, globular bodies, of the colour of connective tissue, slightly gray and translucent, and constitute the so-called fibrous tubercle. When tuberculization is very rapid, distinct polypoid masses may be formed upon the membrane. And he quotes Virchow, as saying, "that whatever analogy this development may present in general with the tuberculosis of man, the size and pedunculated disposition of the nodules always afford a striking means of distinguishing them."

The condition of the lungs is next considered, and the description of Trasbot is followed, who states "that the tubercles in the lungs are of small size, and that the larger masses are formed from their confluence. When the tubercles are first formed, there are no vessels in their interior; in consequence of this they undergo degeneration in the centre, and are either calcified or softened. Calcification takes place in the middle, while the periphery remains fibrous or simulates a capsule. When softening takes place, it extends to the periphery, and the contents being removed

in some way there result closed cavities, which may reach the size of a walnut, from the confluence of several adjacent nodules. The walls of these cavities are quite smooth and thick." This, Dr. Creighton thinks, is the way in which the greater part of the cavities found in the lungs originate, and the idea that they are due to bronchiectasis (Virchow) he regards as arising from an error of observation. It is upon the occurrence of such closed vomicae in the lungs of his cases that he lays great weight in the identification of the process.

In cattle there is so often found associated disease of the lymph-glands, that another of the popular names is "gland disease." In his cases, again, he regards this association as an important factor.

In the other organs of cattle, the tubercles are found, but in the liver they are not encysted in the true sense of the word. Ulcers occur in the intestine, and the disease often invades the genito-urinary tract, and lastly, the mammary gland.

Chapter III. is a short *résumé* of the work of Gerlach on the communicability of bovine tuberculosis to other animals by experiment. And the point which the author wishes to call attention to is, that the disease produced in the animals experimented upon has the same character as the original, and this mimicry shows itself especially in growths on the pleura along the sharp margin of the lungs. It is true this is but a very feeble reproduction of the original, in fact, a mimicry, but, nevertheless, is to be "regarded as the beginning of *Perlsucht*."

In Chapter IV. he gives the clinical history and anatomical appearances as found by him in twelve cases of tuberculosis in man. The histology is preserved for a subsequent chapter. The clinical history throws but little light upon the cases except to show that with one exception they were quite acute (which it will be remembered is the contrary of the course taken by the disease in cattle). The specific nature of the affection is based simply upon the occurrence of more or less flattened or polypoid nodules upon the serous surfaces, and especially along the free edge of the lung, with wedge-shaped medullary looking masses and closed cavities having thickened walls in the substance of the lungs, giving to it a peculiar "crumpet-like" appearance.

In Case 1 there were simply nodules in the lung. Case 2 had nodules in the lung, with flat tubercles on the serous surfaces. Case 3 had cheesy bronchial glands, with white, sessile, and even pedunculated tubercles on the pleura. There were large white tubercles in the lungs. In Case 4 a lung contained several sloughing and putrid cavities, with softened packets of bronchial glands, and large round tubercles in the parenchyma. In Case 5 there was found an enormous cluster of enlarged portal glands containing round nodules. Bronchial and mesenteric glands also enlarged. Tubercles upon the serous surfaces, some distinctly pedunculated, also in the lungs together with closed vomicae. Case 6 presented nothing upon the serous surface, the identity resting upon the occurrence of closed cavities in the left apex ("Crumpet" lung). In Case 7 the lungs were found extensively destroyed, the left upper lobe being replaced by a cavity, and a second the size of a billiard ball occupying the right side. The walls of these cavities were dense and cartilaginous. From the pleura hung a number of flat pendulous nodules, and the lower margin of one lung had a beaded appearance. In Case 8 occur again what the author considers as characteristic outgrowths from the pleural surface, with white and centrally softened tubercles in the lung. The bronchial glands were

also enlarged and softened. Case 9 is one of cardiac disease in which were seen the "duckweed" variety of pleural outgrowths, and also the rounded and beaded condition of the free edge. In the parenchyma of the lung there were whitish tubercles of considerable size, and from the peritoneal surface flat excrescences. Mesenteric glands enlarged and calcified. In Case 10 there were tubercles of the lungs, with a wedge-shaped infarct of new growth in one of them. Again tubercles and flat masses on the peritoneum. Cases 11 and 12 had whitish-gray medullary masses and wedge-shaped masses in the lungs. The glands were especially affected, but there was very little of the peculiar outgrowth from the serous surfaces, while white medullary swelling and ulceration of the follicles of the intestine were noticed.

In five of these twelve cases the "characteristic" pleural outgrowths are wanting, or only very slightly marked, and the specific nature of the affection rests upon the peculiar shape of the masses in the parenchyma, which have a tendency to form closed cavities with smooth walls.

Chapter V. is devoted to a consideration of the formations on the serous membranes. It is but an expansion of what has already been stated, viz., that the tubercles begin as vascular excrescences, and their occurrence on the thin margin of the lung is brought forward as marks of their specific character. He acknowledges that in but three of his cases (2, 5, and 10) large flat tubercles can be said to have been really formed; but thinks "that the slight indications found on the lungs in the other cases are something special and specific beyond doubt." He, however, does not give the finer histological appearances which would enable them to be distinguished from the results of pleurisy or peritonitis.

Chapter VI. takes up the disease in the lungs. He supports the gross appearances in his cases on the description of *Trasbot*, already often quoted, of the closed vomicae in the lungs of cattle, and his histological evidence rests on the similarity which exists in the structure of the tubercles in his cases and those which occurred in the lungs of rabbits that had been fed on masses of *Perlsucht* by Orth;—the distinctive point being the presence of great numbers of giant cells of a perfect type in the nodules. He, however, admits that these are not pathognomonic, but are only of value when taken in connection with the presence of the characteristic outgrowths from the serous surfaces and the affection of the glands. The occurrence of such large numbers of giant cells he considers as standing in direct relation with the attempts at vascularization, as shown by the large number of vessels at the periphery of the tubercles.

Chapter VII. treats of the condition of the lymphatic glands. He shows the similarity which exists between the affected glands in his cases and in *Perlsucht* both in the gross and microscopic appearance, and he considers that the tuberculous of the lymphatic glands is not the origin of the tuberculosis elsewhere in the body, as has been held by many, but is a co-ordinate part of a general infection. The evidence presented in this chapter is one derived principally from analogy, especially with syphilis, which he considers this disease closely resembles in its course.

In Chapter VIII. an account is given of the intestinal lesion which he found in three of the twelve cases. In two of these the lesions were recent, in one consisting merely of swelling of the follicles, with occasional loss of substance; in the other the ulcerations were of the ordinary round kind. He dwells upon the third case at considerable length. It was that of a woman who had been in the hospital for what was diagnosticated as

typhoid fever. She returned seven months later with symptoms of rather a rheumatic character, but before her death the diagnosis of acute miliary tuberculosis was established. There was found at the autopsy an eruption of flat nodules on the peritoneum, two healed ulcers of the ileum, over the base of which, between the outer muscular coat and the serous surface, was a cicatricial thickening in which was seen the peculiar arrangement of epithelioid about giant cells, which he considers characteristic of bovine tuberculosis. This case he regards not as one of typhoid fever from the start, but as *Perlsucht*. His wording, however, is a little doubtful, for he says (p. 88): "they were originally ulcers of typhoid fever, but in their healing, or in their subsequent induration, they retained their specific infective property, which afterwards manifested itself in the general tuberculosis," etc.

The rest of the chapter he devotes to attempting to show that many recorded cases of typhoid fever in which tubercles have been found post-mortem are probably bovine tuberculosis. The account upon which he lays the greatest stress is the report of 20 cases which occurred at the Bristol Infirmary, and in which the clinical symptoms were regarded as typhoid fever. Four of the boys died, and there were found tubercles of the serous surfaces as well as ulceration of Peyer's patches in all four cases. This he regards as evidence of bovine tuberculosis, and considers the epidemic as one of that disease which the boys had contracted from drinking infected milk, although defects in the drainage of the school were discovered. In the other 16 cases the disease was of a lighter character, and ended in recovery.

Chapter IX., and last, is a summary of what has already been said.

In reviewing the evidence presented to us by Dr. Creighton, we feel, as he seems to, the rather slim foundation on which he has rested his assumptions. His argument rests first upon the fact that the *Perlsucht* of cattle can be produced in other animals by feeding them with masses of the disease, and with milk, the latter being presumably the way in which man could acquire it. The experiments of Gerlach, Klebs, Orth, and Virchow, are held as establishing this fact: but of these, the series conducted by Virchow is the latest, and by far the most complete, and the very doubtful success which has attended it makes the question at least still to be considered as *sub judice*.

Turning to the part which he has done himself, it is a striking fact that there are apparently no cases which have come under his observation since his attention was directed to the subject, but what have presented to him the characteristic appearance of bovine tuberculosis, and yet he does not deny the existence of cases originating in other ways. Among his cases are certainly some which need stronger confirmation; take Case 4 (p. 32), for example, which is reported simply as having several sloughing or putrid cavities with large round tubercles in the intervening lung substance. No account is given of the microscopic appearances, and there is no way without this careful examination by which such cavities and nodules can be distinguished from those resulting from chronic, miliary, and cheesy pneumonia. Certainly a case like this shows a biased judgment on the part of the observer, and makes us hesitate in accepting his conclusions without the fullest proof. It looks almost as if he had taken his cases from one "dust bin of pathology" (as he calls tuberculosis), and had transferred them to another dust bin called bovine tuberculosis. The value of the mimicry of infection must not be rated too highly in dis-

tinguishing between different kinds of tuberculosis, when it must first be shown that what are regarded as the expression of a specific tuberculosis ("the duckweed" and "pearls" on the serosa in his cases) are not the products of chronic inflammatory changes in which tubercles have been developed secondarily. The proof of the anatomical identity and the possibility of distinguishing post-mortem cases of bovine tuberculosis in man, must rest on finer and more conclusive evidence than that presented by Dr. Creighton. His suggestion, however, is very valuable, and he certainly deserves the thanks of all pathologists for calling attention to the subject in so forcible a way, and although we cannot agree that the proof he has presented is at all complete, we fully appreciate his labour and zeal in giving such an attractive and well published book.

W. F. W.

ART. XXV.—*St. Bartholomew's Hospital Reports.* Edited by W. S. CHURCH, M.D., and ALFRED WILLETT, F.R.C.S. Vol. XVI. 8vo. pp. xxvii., 363, 123. London: Smith, Elder & Co., 1880.

IN noticing the contents of this serial volume, we shall pursue the course usually adopted in this Journal, and, separating the surgical and medical papers, speak first of those possessing special interest to surgeons, although this year some of the papers we class as surgical are contributed by medical men.

The first article is *A Contribution to the Minute Anatomy of the Organ of Jacobson*, by E. KLEIN, M.D., F.R.S. As its title indicates it is an examination of Jacobson's gland, and in it are well exhibited the scientific thoroughness and ability of its author. As the result of his observations Mr. Klein is not disposed to adopt the somewhat fanciful view of Kölliker, that the function of this body is a quasi-subjective one, namely, to ascertain the chemical constitution of the animal's own juices, but is rather inclined to think that its rudimentary condition in man points to its having something to do with the very high development of the sense of smell possessed by some of the brutes. The suggestion is modestly made, but seems quite reasonable.

Foreign Bodies in the Air-passages, by SAMUEL GEE, M.D. While contributed by a medical man, the subject of this paper is one with which surgeons generally have to do. It consists of an account of two cases, in one of which a fruit stone, in the other a piece of bone, passed through the larynx. In the first case tracheotomy was unsuccessfully performed, and the foreign body was found in the right bronchus after the death of the child. The second case had a more happy issue, the piece of bone, deprived of all but its calcareous framework, being coughed up about one month after its entrance into the throat. The case is narrated in the words of the sufferer, a clergyman, and is therefore void of any careful or accurate description.

The next article is of decided value, being headed *Some Cases of Abdominal Surgery (with remarks)*, by HOWARD MARSH. The first of the cases was one of intestinal obstruction, in which an internal tumour could be made out through the abdominal walls, and in which there was also a small, tense, and apparently strangulated hernia. Although the sensations of pain were all referred to the abdominal tumour it was thought

best to operate upon the hernia, and when this was found to contain nothing but a large amount of abdominal fluid, an abdominal section was made, and twelve inches of the jejunum were found to have passed through an opening in the great omentum. The well-defined edge of this opening was readily divided, and the congested gut released. At first everything promised fairly, and all the symptoms were relieved, but death ultimately ensued after ten days from septicaemia.

Mr. Marsh thinks, with justice, that there is good ground to hope for the attainment of greater diagnostic accuracy in these always obscure cases, and that as a contribution to this end every case should be reported, whether successful or otherwise, as it is by the knowledge of the mistakes competent surgeons have made, we may hope to avoid their recurrence. In this particular case the herniotomy was proved to be useless, and of course increased the danger; but it seems to us the error could hardly have been avoided, while the unfavourable result would appear to have been fully accounted for by the condition of the patient's constitution.

As part of the same paper three successful cases of herniotomy in young adults are narrated. They were all congenital, and the ring was very small in each case. Mr. Marsh's remarks are judicious, and his conclusion that the palm for detrimental surgery should be awarded to prolonged taxis and the putting off of an operation is, in our judgment, indisputable.

Anatomical Variations: an Account of a few of the more interesting Abnormalities, with Remarks on their Morphological significance and their Bearing on the Practice of Surgery, is part of the title of an article by W. J. WALSHAM. It is the result of seven years' observation, and contains many items interesting to the anatomist, and some of which are possessed of importance to surgeons. As is usual, the greater number are muscular, but some concern the vascular and lymphatic systems. Two instances of unusual course of the phrenic nerves—one of peculiar peritoneal attachments, and one of "septed uterus and double vagina" are given; but the paper cannot be analyzed so as to be of interest to the general reader.

On Dilatation of the Uterus in Extroversion of the Bladder, by FRANCIS HENRY CHAMPNEYS, M.B., is a suggestive article. It draws attention to the frequent association of these conditions, and makes some inquiry as to its cause. As prolonged enuresis is fatal by blood poisoning, Mr. Champneys queries whether the early death which so often occurs in cases suffering with extroversions of the bladder may not be traced to this cause.

A very interesting paper is contributed by SAMUEL WEST, M.B., on *Mimic or Phantom Aneurisms*. It contains an account of a series of cases in which the symptoms of aneurism in various vessels appeared and disappeared. The subject is one which has been noticed by Sir James Paget, and will interest all medical men. The localized rhythmical pulsation of arteries has been often observed, and is generally quite amenable to sedative and tonic treatment, but to notice real or apparent temporary dilatation has not been a common observation. It would be interesting to learn whether in any of the cases observed by Dr. West the phantom tumours were ever followed by permanent dilatation. The paper is a suggestive one, well worthy of careful perusal, and should provoke to further study of the subject.

The next surgical paper is an account of *Two Cases of Aural Exostosis*, by A. E. CUMBERBATCH. Mr. Cumberbatch is inclined to think that

these tumours are very often attributable to gout as an irritating cause, that diathesis having been undoubtedly present in seven out of eleven cases observed by him. There is almost always present more or less catarrh of the middle ear. Noticing that the external auditory meatus was narrowed quite as much by swelling of the soft parts as by the bony growth, the author of the article advises a resort to caustics, which, being followed by contraction of the cicatricial tissue, tend to enlarge the lumen of the meatus. Mr. Cumberbatch's experience with this method leads him to think it preferable to attempting the extirpation of the bony growth, which is sometimes sessile and very hard, making its removal difficult, and in some cases impossible. Mr. Cumberbatch announces his intention of trying the galvanic cautery in the next case which comes under his observation.

MR. W. MORRANT BAKER next narrates *Two Cases of Acute Arthritis of Infants*, respectively six and nine months old, in which he evacuated pus from the knee-joint by incision with most satisfactory results. The cases are placed upon record to make them available for statistical purposes in the study of this formidable affection, to which attention was drawn by Mr. Thomas Smith in the tenth volume of *St. Bartholomew's Reports*.

MR. C. B. LOCKWOOD contributed a paper entitled *Cases of Syphilis*. It is the result of a year's residence in the Male Lock Hospital. It does not profess to contain original observations, but is well written and of interest. The most noticeable thing in it is the record of three cases in which hypodermic injections of one-sixth of a grain of nitrate of pilocarpin (*jaborandi*) were used to aid in the production of sweating, where mercurials and iodides had failed to work amendment. The results were very speedy and good.

A Case of Congenital Absence of one Olfactory Bulb, by T. CLAYE SHAW, M.D., is very interesting. It occurred in the person of a woman, aged 53, who had been insane for twenty years. The right olfactory bulb and nerve were completely absent, and there were no foramina in the cribriform plate of the ethmoid bone on that side. No suspicions had been entertained of this state of things during life. A cut showing the appearance presented by the front part of the base of the brain accompanies the paper.

Remarks upon Resection of the Tendo-Achillis in Paralytic Talipes Calcaneus, with an Account of a New Method of performing this Operation, by ALFRED WILLETT, is the next surgical paper. Convinced that operative measures for the relief of those cases in which the heel drops as the result of an attenuated tendon, have been too much neglected, Mr. Willett has resected the tendon under the carbolic spray, and, having removed a piece, brought the ends together by wire sutures extending through the integument. Three cases are given in which much good was accomplished by this measure. The details of the operation practised by Mr. Willett are given with admirable conciseness and accuracy.

Port Sanitary Work is the title of a paper left unfinished by the death of its author, Mr. HARRY LEACH. It deals principally with two points, namely, ventilation and water supply. In Great Britain the number of the population who live afloat is very large, and the sanitary condition of their surroundings is gradually receiving the attention which the importance of the subject demands. In this country, while our population similarly situated is large, outside of the navy almost no attention is paid to the subject. The Marine-Hospital cares for merchant seamen when they

are sick, but we are not aware of any efforts being made to diminish the amount of disease by removing its causes, or of any preventive sanitary measures being ever instituted. The evil is undoubted and great. It is a field in which much service for humanity could be done. Mr. Leach is convinced, and we think his conclusion indubitable, that ventilation is best effected by the exhaust system rather than by the reverse method of pumping air into the vessel. He draws attention to the importance of furnishing a pure water supply instead of taking it direct from rivers in much frequented ports. The paper bears evidence of the incompleteness in which it was left by its author, but it is interesting, and should serve to direct attention to the very important subject of which it treats.

It is noteworthy that but one of the surgeons and two of the assistant-surgeons connected with this great hospital have thought it worth while to contribute to this volume of its reports. S. A.

We shall now notice the medical papers of the volume.

The irregularities of digestion, so common in all forms of disorders of the nervous system, and more especially among the inmates of asylums for the insane, have led Dr. T. CLAYE SHAW to examine, post-mortem, the structure of the intestines in a series of cases. He communicates the results of his studies in a paper *On Some Intestinal Lesions of the Insane*, in which he states that he met with lesions so constantly and of so profound a nature that it occurred to him that many serious symptoms observed during life may be directly connected with, and interpreted by, them, and a clue thus obtained to a more rational line of treatment both by diet and medicine. More especially observed in the subjects of dementia and general paralysis, they may also be recognized in acute insanity, and even in persons who are merely in "a nervous condition." The appearances are described as follows: "The lesions are situated chiefly in the colon and in the jejunum, they are patches of ulceration sometimes so extensive as to resemble a honey-comb network. The edges are usually slightly raised, and perhaps reddened, but the ulcers are at other times more like punchings out of the mucous membrane, and there is often a little loose gelatinous material." The author attributes this degeneration of tissue of the intestinal canal, primarily, to irregular and imperfect action of the involuntary muscular fibre of the bowel, loss of power over the sphincter being a common sign of nervous disorder.

Dr. REGINALD SOUTHEY contributes a very interesting case of *Symmetrical Gangrene and Some Remarks upon the Disease*. The patient was an ill-nourished woman of forty years, who had suffered from rheumatic fever, said to have been followed by typhoid, eighteen years before the present disorder appeared, smallpox nine years before, and general dropsy two years before. She had also, about this time, several attacks of numbness and coldness of both hands, and upon one occasion the fingers became purple and continued so for about an hour, this was repeated for several days, at the same time she passed dark blood-coloured urine (intermittent hæmatinuria). Subsequently the toes became affected like the fingers, but after a month's treatment she became better, and was free for a whole year from these attacks of local syncope. She next had an attack in hot weather during the month of July, which began with a convulsion, and ten days later both legs above the ankles became suddenly of a livid blue colour; the disorder was attended by an aching pain, the parts presented a bruised appearance, and they were a trifle swelled. A small

amount of albuminuria existed, but it is not stated whether an excess of sugar was present. The patches of blood-stasis subsequently became gangrenous, and the over-lying cuticle elevated by a large amount of blood-stained serum, which was so offensive as to require charcoal poultices. Under good nursing, and liberal diet and tonics she recovered, the ulcers not finally healing until five months after the onset of the disorder. During this period transitory local stasis of the circulation also appeared in the upper extremities, but did not cause gangrene as in the lower. The general symptoms, except the pain, were almost *nil*, and only a very slight increase in pulse and temperature occurred.

In these cases it is not uncommon to meet with anæmic cardiac murmurs due to an effect upon the vaso-motor nerves by an exaggeration of the excito-motor function of the spinal cord, according to Raynaud¹ (who calls the disease juvenile gangrene to distinguish it from the senile form).

A very good *résumé* of recorded cases of this singular disorder is appended to the paper, instances of which have been reported in this country by Dr. J. C. Warren² and by Dr. Chas. K. Mills.³

In a clinical paper on *Diseases of the Nervous System* Dr. SAMUEL GEE contributes reports of cases of spastic paraplegia in infancy and adult age; spastic diplegia; sclerosis of encephalon in inherited syphilis; paralysis due to compression of the arm; traumatic myelitis followed by muscular atrophy and spastic rigidity; motor ataxia of legs, with spasm of the orbicularis oris; teichopsia; and infantile spinal paralysis, which are models of terseness, and scarcely admit of condensation. The notes upon spastic paraplegia in infants are continued from the Reports for 1877, the present paper containing four more cases; no observation of the state of the genital organs as regards phimosis, etc., is communicated; chloroform usually overcame the rigidity for a time. One case, of an adult man, is also reported, which is assumed to be an illustration of the spasmodic spinal paralysis of Erb, but the sudden onset, and the subsequent slow course of the malady, would suggest meningeal hemorrhage as a possible explanation of the symptoms. In the case of spastic diplegia, sclerosis of the whole encephalon was detected after death; the patient was a girl eleven years old, and had been subject to a chronic otorrhœa following scarlatina. A microscopic examination of the brain showed atrophy of nerve-cells, but no obvious increase of neuralgia, the gray matter was infiltrated by leucocytes, and the brain was small and felt unduly hard. Another case of cerebral sclerosis is reported with the autopsy, in a girl ten years old, suffering with inherited syphilis. The case of teichopsia, or transient hemiopsia, occurred in a man of literary pursuits, and was apparently connected with overwork. The notes are by the patient, and form an interesting contribution to this unusual form of disorder. The note in conclusion upon infantile spinal paralysis, states that Sir Walter Scott's lameness was undoubtedly attributable to this form of disease, his attack occurring in 1774, or before Underwood brought out his work which is said to contain the earliest description of infantile paralysis.

In a separate paper on *Purpura in Chronic Nephritis*, Dr. GEE furnishes the clinical notes of three cases of purpuric spots with intermittent hæmatinuria, and slight albuminuria that appear in their etiology and

¹ Archiv. Gén. de Méd. 1874, p. 5.

² Boston Med. and Surg. Journ., Jan. 16, 1879.

³ American Journal of Medical Sciences, October, 1878.

clinical features to be closely related with the case reported by Dr. Southey, already referred to.

Dr. J. WICKHAM LEGG contributes the notes of a *Case of Delirium Tremens complicated with Jaundice*, which from the clinical history appears to be rather one of jaundice accompanied by delirium, occurring in a man of intemperate habits. "He had then attacks of jaundice, all of which ran the following course: First, vomiting and diarrhœa of greater or less intensity, for a few days; then the appearance of jaundice; after the jaundice had been established some hours, great pain in the right hypochondrium and belly came on; then, commonly after an interval of some days, delirium showed itself, delirium which had all the characters of that commonly set down to excess in spirits. After a few days of this delirium tremens, the nervous symptoms ceased, leaving the jaundice, however, to last for several weeks longer, at the end of which time the man regained his accustomed health." Three months after his last discharge from the hospital, however, he was still jaundiced, and the liver could be felt midway between the ribs and umbilicus. There was no albuminuria, and no fever. It would have been of great interest had the patient died during one of these attacks to have seen whether anything like the characteristic lesions of *icterus gravis* could have been found, as they have been met with in other fatal cases of alcohol poisoning.

In a continuation of a paper in last year's reports, Dr. VINCENT HARRIS offers some *Remarks on Angina Pectoris*, in which the pathology is especially considered. The views of a number of authorities are given, and the writer, without definitely declaring the question settled, evidently favours the view that the dilatation of the fatty heart is a principal cause, the pain being reflex from irritation of the cardiac nerves, radiating in severe cases through the connection of the cardiac plexus with the spinal nerves to the brachial and cervical plexuses.

In a contribution *On the Present State of our Knowledge in Regard to Ferments*, Mr. D'ARCY POWER gives a brief sketch of the present theories concerning the ferment process, and reviews *seriatim* the principal varieties belonging to the two great classes, morphological and non-morphological. To the latter alone does the term ferment properly belong. True ferments have neither shape nor form, and can be detected only by their results; they have no power of reproduction, do not increase in bulk during fermentation, and are in every case the product of secreting cells. The morphological or formed ferments, on the contrary, are of a vegetable nature, and their power is conterminous with their life, whilst it is arrested or destroyed by a variety of reagents which have no effect upon soluble ferments. It is a suggestive fact that Claude Bernard and Kühne succeeded in obtaining, in some cases at least, a non-morphological ferment from a ferment of the morphological group, which led Bernard in his last work to deny that vegetation was anything more than the indirect cause even of saccharine fermentation.

Some Cases of Intracranial Syphilis by J. A. ORMEROD, M.B., includes the notes of three cases of obvious cerebral disorder, gradual hemiplegia, and in two, ophthalmoscopic evidences of syphilis, occurring in adults prior to middle age, in all of which great improvement took place under the mixed treatment. In some introductory remarks it is held that syphilis is a common cause of nervous disease, and that disastrous results may be averted by prompt recognition and proper treatment. Syphilis of the brain is usually meningeal, sometimes affecting the bones but not

the cortex nor the nerve trunks excepting secondarily; or it may occur as a growth or deposit in the coats of the cerebral arteries between the endothelium and membrana fenestrata, encroaching upon the calibre of the vessels and forming thrombosis. Where direct evidence of syphilis is wanting, diagnosis by exclusion is left, which may be confirmed by anti-syphilitic treatment. Epileptiform attacks commencing in middle life are to be viewed with suspicion. "A state of obfuscation and somnolence not amounting to coma, but lasting for weeks," Dr. Buzzard says suggests syphilitic cerebral thrombosis. The ophthalmoscopic appearances of retino-choroiditis, and neuro-retinitis will often aid the diagnosis.

The *Changes in the Optic Disk Associated with Spinal Concussion* is the title of a paper by W. BRUCE CLARK, M.B., who reports several cases in which intense hyperæmia of the disk was detected which disappeared *pari passu* with the other symptoms. He believes this test to be valuable in detecting malingerers after railroad accidents.

Mr. WALTER H. JESSOP reports a typical *Case of Hystero-epilepsy with Hemianæsthesia and Chorea*, in a girl of 20 years, in which ovarian compression and metallo-therapy were alike ineffectual in relieving the symptoms. The attacks first appeared after scarlet fever, which evidently damaged the nervous system, although unaccompanied by nephritic symptoms. The condition of the eyes was interesting, as the changes noticed in them remained permanent notwithstanding the return of sensation in the other parts. Amaurosis in the left eye was nearly complete, and did not alter for at least six months, though no cause could be found on examination to account for it. In the right eye, besides a contraction of the colour-field, there was a large central scotoma. While under observation in the hospital chorea developed which became very violent, being unaffected by large doses of chloral and bromide of potassium. Great improvement subsequently occurred from hypodermic injections of liquor sodæ arseniatis (five minims three times daily). The case was undoubtedly one of hystero-epilepsy with anæsthesia, analgesia, ischæmia, paralysis, contractures, amaurosis, and chorea.

Dr. DYCE DUCKWORTH, in an interesting essay on *Unequivocal Gouty Disease*, reviews in order the various phenomena that may be considered a characteristic of gout; furnishing a valuable contribution to its pathology from the stand-point of clinical experience. Accepting the occasional coalescence of the two arthritic disorders in rheumatic gout, he further acknowledges a close relationship existing between them, gout in the parents favouring rheumatism in the children and *vice versâ*. Cases of gout with urate of soda deposits constitute a distinct clinical group. The nervous element must always be taken into consideration in separating gout from rheumatism; and this nervous erethism makes the gouty patient especially irritable, and unable to withstand the pain which seems disproportionate to the amount of the arthritis. Desquamation does not usually occur in rheumatism; peri- and endo-cardial complications are almost unknown in gout. The effect upon the kidney, upon the special senses, and the marked disturbance of the liver and respiratory tract, are well known, while gouty urinary troubles, including urethral stricture, are as specific as the other changes referred to. The author believes that in women, too little heed has been paid to gouty affections of the uterus. The view of the author that gout is very distinctly a neurosis has been elsewhere defended. It is commonly known that the nervous manifestations of the gouty diathesis are not rare, and among which neuralgia

(occipital and chiefly right-sided) stands at the fore-front, while local paralysis or spasms, and vertigo, headaches, and glycosuria are frequent, gouty apoplexy or mania more rare. A pregnant observation is contained in the following sentence: "the whole of a gouty attack may, I believe, expend itself sometimes in a frightful attack of rage and irascibility," as it affects the responsibility of gouty subjects for acts of violence or possibly of crime.

DRS. T. LAUDER BRUNTON and THEODORE CASH contribute a physiological note upon the *Explanation of Stannius's Experiment, and on the Action of Strychnia upon the Heart*. The still-stand of the heart after ligature of the sinus venosus, the experimenters believe to be attributable to an interference with the passage of the normal reflex stimulation arising in the afferent nerves of the cavities or walls of the heart. The injection of strychnia into the ventricles restored temporarily the pulsations, showing that strychnia is a cardiac stimulant. The action of this drug in prolonged overwork and mental strain is undoubtedly great. "Small doses of strychnia or nux vomica restore both mental and physical power, and give a sense of well-being in a manner in which, so far as our experience goes, nothing else will."

Dr. BRUNTON also furnishes a paper on the *Cause of the Non-precipitation of Oxide of Copper in testing Certain Cases of Diabetic Urine*. Having noticed that in a case of diabetes on applying the usual test the Pavy solution was decolorized by heat, but no precipitate occurred, he subsequently determined by a series of experiments that the agent which had the power of keeping the copper in solution was indican or some agent closely allied to it, since such urines gave a purple coloration with cold nitric acid. Creatinine also exerts a similar effect in healthy urine. In typical diabetic cases, these constituents are deficient, and Brunton concludes that "such cases must therefore, in addition to the increased formation of sugar, be complicated with another pathological process, which consists in the non-formation or non-excretion of these substances." Where the precipitate is not obtained in diabetic cases it usually indicates a slow course of the disease, and a more favourable prognosis.

The *Notes of Post-mortem Examinations of Cases of Hemorrhage within the Cranium* made by Dr. NORMAN MOORE, are contained in a paper which includes the autopsies of fourteen cases, ten in the basal ganglia, two in the pons, and two in the surface of the hemispheres. Without attempting an extended analysis, the cases show conclusively the close relation existing between hypertrophy of the heart and cerebral hemorrhage; for in every case the heart was larger than natural; in ten the apoplexy was associated with chronic interstitial nephritis.

Dr. WICKHAM LEGG in a paper *On Certain Abdominal Tumours* furnishes some very interesting cases, two of which are instances of hardening of the linea alba and umbilicus with post-mortem examinations. Although this condition is frequently associated with malignant disease of the viscera, yet, since it has also been noticed in tubercular peritonitis, it cannot be looked upon as pathognomonic. Cases of aortic aneurism, perityphlitis complicated with thrombosis of the femoral vein, and several of renal tumours of different kinds, are also reported in this valuable paper.

A clinical essay on *Perimetritis and Parametritis*, by WALTER S. A. GRIFFITH, concludes the medical papers in this volume of Reports. Cases illustrating the different varieties of perimetritis and parametritis are

reported, and some analytical tables are appended, showing the seat of lesion, assigned cause, result, age of patient, how long married, births, miscarriages, etc., which make it of more than usual interest and value.

We notice as a new feature of this volume, on page 66, a table showing the effects of season on the frequency and fatality of some of the principal diseases, which, in deference to the growing importance of the question of the effects of meteorological conditions on disease, we hope will be continued and extended in some directions so as to show the influence of barometric changes upon constitutional disorders and the effects of surgical operations.

F. W.

ART. XXVI.—*On the Antagonism between Medicines, and between Remedies and Diseases. Being the Cartwright Lectures for the year 1880.*

By ROBERTS BARTHOLOW, M.A., M.D., LL.D., Professor of Materia Medica and General Therapeutics in Jefferson Medical College, Philadelphia, etc. etc. Pp. 122. New York: D. Appleton & Co., 1881.

THIS neatly printed volume contains the six lectures delivered by Professor Bartholow, last winter, in New York, in accordance with the Cartwright bequest to the Alumni Association of the College of Physicians and Surgeons of that city. They constitute a highly appropriate topic for the initial lectures under the generous bequest of the founder,—a bequest as honourable to the benefactor, as it is rare in the experience of the medical profession.

After a rapid, though sufficiently comprehensive history of the subject of the antagonism of remedies from the period of Magendie and Bernard, the author illustrates what he terms the “physical basis of the principle” by appropriate examples taken from the domain of physics, and then takes up for his first consideration the antagonism between *opium* and *belladonna*, very properly stating that this antagonism is supported by clinical rather than by experimental observation. We may remark, in passing, that the method adopted by the author, as indeed by all experimenters in this line of research, is to observe the effects of the various antagonistic remedies upon the lower animals, and then confirm the results, so far as may be practicable, by clinical experience on man. But in these investigations, the results of which have shed so much light upon modern therapeutics, one fact should not be overlooked, namely, that we are not *always* authorized from experiments upon the lower animals to predicate results upon the human subject; and this simply from the circumstance that remedial agents do not always produce similar effects upon the two systems. Witness, for example, the extreme tolerance of the rabbit and dog for atropia, and of birds for morphia. But with this caution, we may pursue this interesting investigation, and be grateful for the amount of practical benefit derived therefrom.

To revert to the antagonism between opium and belladonna, the author has collected 120 cases where these remedies were employed antagonistically on man, of which 12.5 per cent. only were failures. Of course, due allowance must be made for the influence of accessory measures, such as emetics, coffee, galvanism, etc.; and, as he justly remarks, the non-successful cases should be particularly studied, since most of them show satis-

factory reasons for the failure of the remedy. Our own experience fully confirms that of the author, that "the clinical evidence is conclusive" on the antagonizing action of these two substances. Unfortunately perhaps for the positive establishment of the theory, the results of experiments upon animals have not appeared to be entirely in accord with clinical observations, although they have been attended with undoubted benefit in demonstrating the *mode* of antagonism upon them, as for example, in the diversity of their action on the brain, lungs, heart, pupil, stomach, and skin. A very timely caution is given, that in poisoning by either of these drugs, the antagonistic should be used only in small doses, frequently repeated, and that "the condition of the respiration and circulation be taken as guides rather than the state of the pupil."

The antagonism next examined is that between *atropia* and *physostigmia* (eserine). The researches of Prof. Frazer, of Edinburgh, on this subject are familiar to our readers. The author claims a priority in his own experiments made in 1868, a year before the publication of Frazer's investigations. His opinion is that these agents are physiologically antagonistic in the lungs, heart, brain, pupil and sympathetic; but he agrees with Frazer that they are not therapeutically so.

The very diverse effects of *atropia* and *pilocarpin* on the human system afford an admirable illustration of the antagonism of remedies. The author adduces an instance of this in his own person. Having injected subcutaneously one-fourth of a grain of pilocarpin, and experienced profuse salivation and general perspiration in a few minutes, the injection of the one-hundredth of a grain of atropia produced within five minutes a complete reaction, arresting the sweating, and restoring the natural warmth and vigour of the body.

The antagonism between *atropia* and *muscarin* (from *amanita muscaria*) appears to be physiologically complete on the brain, heart, lungs, eye, and the secretions generally.

Between *atropia* and *aconitia* there seems to be a decided antagonism, the one being a stimulant to the respiratory and cardiac centres, while the other is a depressant to the same. The researches of Dr. J. Milner Fothergill fully confirm this doctrine. An interesting fact is adverted to by the author that atropia may very properly be regarded as the type of the whole class of mydriatics, including hyoscyamia, daturia, and duboisia; and further, that they all possess similar, if not identical, antagonistic powers over the substances above mentioned. The chemical identity of several of them has already been clearly established.

Section IV. discusses the antagonism between *chloral hydrate* and *strychnia*, *chloral* and *picrotorine*, *chloral* and *atropia*, *opium* and *veratrum viride*, *opium* and *gelsemium*, *opium* and *aconitia*, together with *morphia* subcutaneously and *chloroform* by inhalation. As regards the controlling power of chloral hydrate in strychnia poisoning, the author has collected seven cases which undoubtedly establish this fact. The converse, however, is not so well made out, namely, that strychnia is antidotal to chloral poisoning. This difference is explicable by the different physiological impression exerted by these two substances; chloral acts primarily upon the brain, producing stupor and coma, and then upon the spinal cord; it is also a cardiac and respiratory depressant; its impression is similar in many respects to that of opium. Strychnia, while producing no effect upon the brain, is a direct spinal excitant, increasing the reflex activity, stimulating the cardiac and respiratory ganglia, but having no power to remove the coma and other brain troubles.

The antagonism of *chloral* and *atropia* the author believes was first studied by himself, and his results published in 1875. Their opposing effects are more obvious on the circulation and respiration than upon the brain and spinal cord. To a certain extent, their antagonistic powers resemble those of morphia and atropia.

The author refers to some of his own experiments to test the antagonism between *opium* and the so-called cardiac and respiratory depressants, *veratrum viride* and *gelsemium*. The therapeutic opposition of these agents has been verified in several well-marked cases. A striking instance is mentioned of the curative effect of morphia, hypodermically administered, in arresting the poisonous operation of a large dose of gelsemium accidentally swallowed.

The advantages of *mixed anæsthesia* receive a passing notice by the author, who emphatically endorses the propriety of employing morphia subcutaneously at the time of administering chloroform and other anæsthetics by inhalation, as was originally recommended by Bernard and Nussbaum.

The antagonism of *strychnia* and *aconitia*, of *strychnia* and *nitrite of amyl*, and of *aconitia* and *digitalin*, offers a wide and tempting field of investigation, which has been diligently cultivated by the author and other able experimenters. Our limits, however, only allow us this passing notice.

The two last lectures discuss the very interesting subject of "the antagonism between remedies and diseases," which is in fact the basis of our therapeutics. It was an easy and natural induction to apply the principle of the antagonism between different remedies to the idea of antagonizing diseases by certain remedial agents. Thus, for example, the original observations of Magendie on the effects of strychnia upon the spinal cord, producing muscular contractions, led this experimenter, along with Fouquier, to employ this substance as a remedy in paralysis, and all succeeding clinical experience has abundantly demonstrated its value in this disorder. In a similar manner, excessive muscular action, as in spasm, is found to be controlled by the so-called *paralysers*, such as woorara, chloral, potassium bromide, nitrite of amyl, etc. Under this head we are reminded of the beneficial therapeutic effects of the above mentioned remedies in spasmodic neuroses, such as chorea, whooping-cough, laryngismus stridulus, angina pectoris, etc.

As regards the proper antagonists to *pain*, the anodynes, of course occupy the natural position. The sensation of pain, as is well understood, may be relieved either by destroying consciousness through a direct action on the brain, or by preventing the transmission of impressions to the brain through the nerve cords. Anæsthetics do their work in the former case; aconite is an illustration of the latter action, as when, for example, it is applied for the relief of peripheral neuralgia. We quite agree with the author that, as a rule, the best and most efficient means of relieving pain is by the subcutaneous injection of a mixture of morphia and atropia,—a mode of medication which we have been in the habit of employing for many years. We may not now follow the author further in his illustrations to show the antagonism between our various remedies and the diseases we are called upon to combat, except to give a passing notice to the remarkable influence of ergot (especially the hypodermic injection of ergotine) in hemorrhages, aneurism, and in certain kinds of uterine fibroids; the remedial effect in these cases being doubtless due to the diminishing of the calibre of the peripheral vessels.

The same principle of antagonism is also shown to be equally applicable to general or constitutional disease, as well as to local disorders. Inflammation and fever are especially noticed as conspicuous examples. To meet the earlier indications of inflammation—the initial congestion and the corpuscular changes of the blood, the two remedies quinia and morphia seem to be specially indicated. Other agents of lesser importance are digitalis, aconite, and veratrum viride. In the second stage of inflammation, characterized by exudation, the appropriate remedies would appear to be chloral and the alkalies, especially ammonia in the form of carbonate; still later in the progress of the disease, quinia and digitalis are found to be serviceable.

In the treatment of *fever* on the principle of antagonism, the main point, of course, is to reduce the heat, whatever theories may be held in regard to its mode of production. Two methods would here naturally suggest themselves for reducing the temperature: first, to diminish or arrest the production of heat; and secondly, to aid in its dispersion. To meet the first object, remedies termed *antipyretics* are employed, such as quinia, salicylic acid, resorcin, aconite, digitalis, and veratrum viride. The author assigns the foremost rank to quinia as an antipyretic; next comes salicylic acid. Both of these remedies require to be given in large doses in order to produce the desired effect. To accomplish the dispersion of the heat in fever, the all-important remedy is *cold*, which, of course, acts as a direct antagonist. The beneficial therapeutic application of cold is witnessed in all cases of hyperpyrexia, notably in sunstroke. Its value in typhoid fever has, as we all know, been greatly extolled within the last few years.

There are some other points in Professor Bartholow's book of considerable interest, which our limited space will not permit us to notice. The subject that he has selected for his inaugural lectures is a most interesting and important one to the medical practitioner, and one which he has handled with considerable skill and success. We deem his treatise a truly valuable one for our profession.

J. J. R.

ART. XXVII.—*Lectures upon Diseases of the Rectum and the Surgery of the Lower Bowel.* Delivered at the Bellevue Hospital Medical College. By H. W. VAN BUREN, M.D., LL.D. (Yalen.), Professor of the Principles and Practice of Surgery in the Bellevue Hospital Medical College, etc. 8vo. pp. 412. New York: D. Appleton & Co., 1881.

To those who read and appreciated this book in its former and more unpretending shape, the appearance of a new and enlarged edition will be a welcome event. The changes introduced in the text are chiefly additions, embodying the further experience of the author, as well as the contributions of others to the literature of the subject, and bringing the work fully up to the science of the day. The terse, clear, and practical style, and the accuracy of description, which marked the former edition, are to be noted also in this; and these features will commend it to students and young practitioners, as well as to those of larger experience—to all, indeed, who have not yet outlived their capacity to learn.

We should be glad to make the present notice as full and complete as

the merits of the book and the importance of the theme would warrant; but the space available will only allow of the mention of a few points in detail.

As a matter of course, the subject of hemorrhoids is a very prominent one, and is discussed at much length. For the external, the treatment advised is excision; for the internal, the ligature, which is said to be "the safest, surest, and most manageable procedure" (p. 40). The actual cautery, as recommended by Mr. Henry Smith of London, receives much stronger indorsement than in the former edition; being placed "very nearly on a par with the ligature" (p. 41).

We regret to see that the *écraseur* is dismissed, as in the former edition, with a brief and unfavourable mention. Our own experience with this instrument has been such as to lead us to place a high value upon it; we have never seen bleeding of any moment follow its use, while the ligature is confessedly not absolutely free from danger in this respect. In one class of cases—those in which the tumours are partly internal and partly external—the *écraseur* has in our hands proved especially valuable.

Dr. Van Buren advises, and we agree with him, the forcible dilatation of the sphincter and before operations for hemorrhoids. It can hardly be questioned that this lessens, if it does not wholly set aside, the danger of stranguary after these procedures.

Prolapse of the rectum is the subject of a particularly valuable lecture, full of practical good sense; and the same may be said of the topic next discussed—polypi and benign tumours.

The descriptions of abscess near the anus, and of fistula, are very good. Especially in regard to the propriety of operative interference when the latter condition occurs as a concomitant of pulmonary phthisis, the views advanced seem to us thoroughly sound. We cannot but think, however, that the elastic ligature is a remedy of much wider application, in all classes of cases of fistula, than is here allowed. Nor is the iodine treatment, sometimes so admirably successful, accorded sufficient value.

On one subject our author seems to have found reason to change his views, namely, in regard to syphilis as a cause of rectal stricture; for whereas he formerly discredited it *in toto*, he now accords it his free belief, as the result of his clinical studies. Thus he says: "The more I study this subject clinically, the more I am disposed to regard syphilis as a pregnant cause of rectal stricture. In the best and most recent collection of cases of benign stricture, about half are recorded as occurring in syphilitic subjects (Allingham; Mason). Without being conclusive, this is certainly significant evidence. On the Continent, and especially in England, professional opinion is almost unanimous as to the very considerable frequency of syphilis as a cause of this disease" (pp. 269, 270). We think the majority of American hospital surgeons would be willing to endorse this view.

The whole subject of benign stricture of the rectum, pathology, diagnosis, prognosis, and treatment, is very thoroughly considered; and so is that particularly gloomy one, for surgeon as well as for patient—cancer. In regard to both forms of disease, the subjects of colotomy and excision of the rectum are fully and practically discussed; we have only to suggest that their exact relation, as suited each to certain classes of cases, might have been more explicitly stated. Perhaps, however, further experience is needed to establish this on a definite basis.

Taking it as a whole, we regard this volume of lectures as more worthy

of being called a "treatise" than are many books to which that title is given by their authors. It is sure to find a wide and attentive circle of readers.

We cannot conclude this brief notice without mentioning that the present edition contains well-selected illustrations from various sources, and an index covering nine pages, additions which will be at once appreciated. The mechanical execution of the book is highly creditable. J. H. P.

ART. XXVIII.—*The Diseases of Children; a Practical and Systematic Work for Practitioners and Students.* By WILLIAM HENRY DAY, M.D., M.R.C.P. Lond., Physician to Samaritan Hospital for Women and Children. Second edition. Rewritten and much enlarged. 8vo. pp. 728. Philadelphia: Presley Blakiston, 1881.

THE student or practitioner of medicine who desires to inform himself of the cause, diagnosis, and treatment of children's diseases has certainly ample opportunity to gratify this *penchant*, if the size and number of text-books are to be taken into consideration. Meadows's *Tanner* has 507 pages, Meigs and Pepper over 1000 pages, J. Lewis Smith 747 pages, Vogel 593 pages, and the book before us 728 pages; all of them capital works, containing much valuable information, and capable of transforming the ignorant into an inexhaustible mine of precious knowledge. But, alas! knowledge thus acquired, without an opportunity to digest it—to sift the bright coal from the cinders, is a dead weight, and like the book itself, when on the library shelf, ornaments the bearer without adding much except its own ponderosity. A cyclopædia cannot be a text-book, nor should the endeavour be made to make a text-book a cyclopædia; a good book is not necessarily a large book, and the originalities of authors are often so sandwiched between the layers of padding that they lose the force of the very object for which the book was written. If some one would write a thorough description of scarlatina, rubeola, and kindred affections, and then let all the writers of the future simply refer to them, what a blessing it would confer to the readers of the day to come! The rash of scarlatina will, in all probability, remain forever the same, and it needs not the constant enumeration of its peculiarities to make it better known. Dr. Day follows the usual arrangement of authors that have preceded him, giving us fifty-three chapters, including an introduction upon the study, special characteristics, of children's diseases, with hints as to the management and treatment of children, and their constitutional and inherited diseases. He tells us that "the children of the present day are reared differently and fed differently from those half a century ago, and as a consequence the power of disease is greatly modified by such changes," but, alas! such modifications as must result from the change in habits of the mothers of the present time, whose erratic propensities led him to tell us "that late hours lead to fatigue, to excitement, and to stimulating and improper diet, which are sure means of causing them to bear an unhealthy offspring, are certainly not to be considered as the improvements of our century."

His advice is good, but unfortunately it only reaches those who, like himself, are but too well aware already of its importance. He shows for-

cibly that early errors and indiscretions in diet, and care and neglect of her duties on the part of the mother or nurse are a cause, in part, of the diatheses; and that this is the groundwork to begin our treatment of most of the children's diseases, is well brought out in good forcible English, and should be read by all who engage in the general practice of medicine.

From the onset there seems to be the usual want of distinction made between the *disorders* and *diseases* of childhood, and also the difference between those of *infants* and those of children. A disorder, which is simply a transitory functional disturbance, requires different treatment and different management from a disease which represents some pathological change; the one may lead to or involve the other, but every successful practitioner recognizes in them distinct influences at work.

Although rules are laid down by following which it would seem scarcely possible for an infant to do otherwise than live, and we might go so far as to say, on account of the importance attached to them, upon their observance life always hangs, Dr. Day says, "it cannot be denied that some children grow up and thrive even under any system that fancy or caprice of the mother may dictate"—equally true in this country as in England.

The author confirms our own views as to the value of condensed milk. He seems not to exaggerate its value, and we daily see in this country such good results from its use in our large cities during the "heated term" that the gradually accumulating evidence, where so much prejudice previously existed, gives additional force to his strong argument. Milk he regards as *per se* the food for children,—a food in health, a remedy in disease. He objects, of course, to farinaceous food for *infants*, and he regards it justly as the cause of many of the disorders of early life.

Chapter IV. is devoted to the consideration of *Debility*, "a functional impairment, atony, or weakness, or preternatural slowness in the performance or working of the vital processes, leading, when neglected or overlooked, to debility (and it may be to structural change) in one or more of the great central organs of life or tissues of the body." A description which every student should be required to memorize, as it covers the ground of our whole pathology.

This chapter is original, and therefore we may be allowed to call particular attention to it. "These cases of pure and simple debility, when neglected, cause chorea, epilepsy, convulsions, paralysis, etc., and finally lead to those changes in the blood which originate anæmia, tuberculosis, and every form of diathesis that lowers health and provokes disease;" in fact, we may add, it leads to *all* the affections of childhood and adult life, except perhaps, if we may be allowed to suggest an exception, the contagious diseases! Some of us unbelievers do not in so sweeping a manner attribute so much evil to what has been so long taught us as usually a result or a symptom. But the author himself (before noting this), says in treatment "that unless marked indications exist, I entirely disapprove of the pernicious practice of flying to tonics, alteratives, and aperients, as the case may be." Sound advice; but as it is the recognized *one* treatment, as far as the tonics are concerned, that will overcome the great universal cause of disease in his acceptance, it seems like pulling the planks from under him, in our humble view! There is much of interest in this chapter, as it brings us in contact with the author's views of treatment, and notwithstanding his positive assertions to the contrary, as above, his advice in this part is sound; he takes it all back and endorses the *tonic*.

Chapter VI. deals with that famous disease without which coroner's

juries would sadly be at a loss—that great “what is it?” of children’s practice, that has, no doubt, in death certificates covered many a multitude of sins of ignorance and omission,—*marasmus*. Its definition is that of *atrophy*, or a “decrease in size of a tissue or of the whole body with consequent impairment of functions.” “It is not the same process as degeneration, although degeneration is always sooner or later accompanied by atrophy.” “It has its origin in defective nutrition, and is rather to be regarded as a state of extreme debility (again!) and lowered vitality than as a specific and independent affection.” As regards its cause, we may again quote: “as to some other causes,” having mentioned “whatever occasions any great waste of nutritive material,” he tells us “the most frequent are any circumstances that bring about defective nutrition in infants and very young children.” All this is very true, but throws no additional light upon a subject which needs the brightest reflector, and which relates to a disease that is so obviously dependent upon some deeply-seated constitutional fault or taint, as not to merit the careless throwing over of it into the already overcrowded pigeon-hole labelled “Debility.”

There is too much *wording* in this part of the book in purposeless definitions, and too much of the sweeping away of old time-worn cobwebs by broad and meaningless assertions.

From the last chapter which deals with infants, he proceeds to study the fevers of childhood, and second in the list we find typhoid. Dr. Day tells us his views as follows:—

“I must disavow at once any belief in infantile remittents as caused by a separate and distinct poison, or that the disease differs in its nature or causes from that of typhoid. I cannot conceive few greater blunders in practical medicine than to consider this a separate and distinct affection, not following the same course as typhoid, and not leading to the same complications. To me it seems, however, that there is a condition to which this term may be applied without causing confusion; it should be limited to the mildest cases which usually run a quick course, and do not develop into the severe and unmistakable typhoid.”

With such a view (heresy!) there is no wonder that quinia is dismissed with the remark that “quinia with phosphoric acid is an excellent measure,” and a prescription in foot-note. Though, when we come to reflect, we are surprised that he has not found quinia a specific for typhus.

This chapter we consider confusing, because by introducing into it the differential diagnosis of typhoid, acute tuberculosis, cerebral meningitis, dentition, and typhus, the matter is made so difficult of decision, from the great variety of symptoms that seem to be battling for superiority, as to inevitably result in the necessity of a *post-mortem* diagnosis. We have always believed and taught that a diagnosis made by analysis is as difficult as a Chinese puzzle; that it is the grouping of symptoms in their sequence, a diagnosis by synthesis that lifts the veil of obscurity—taking a “bird’s-eye” view of the field, and noting and grouping the prominent symptoms.

The malarial fevers of children which *we* in this land recognize as so important, receive no mention; probably as remittent fevers have been attached to typhoid as its mildest form, and we know that the intermittents are but degrees of the same poisoning as remittent, the generic term typhoid, of Dr. Day, presupposes malarial origin, but if this be the author’s view, he is certainly “off” in the treatment. We hope if a third edition is necessary, that Dr. Day will place himself right in this, for it is necessary if he wishes his work to be of use here or even in India.

We would call attention to the chapter on *rötheln*, which treats of the subject well and gives a clear idea of the characters that distinguish this disease from scarlatina and measles. Its remarkable features are the short premonitory fever, which seldom lasts over twenty-four hours.

"Shivering and febrile disturbance, headache, pain in the limbs, sore throat, redness of the pharynx and tonsils, and in some instances nausea and vomiting." "In addition to these symptoms, the respiratory organs are somewhat slightly affected, and there is catarrh, short cough, sneezing, and coryza." "The eruption first appears on the thorax and arms, but often on the face and neck; it is characterized by small, red, elevated patches, and distinct and minute round papules."

He does not mention the enlargement of the glands, especially the post-cervical glands, which has been so frequently noticed in the recent epidemic in this city, nor does he lay stress on the violent backache that has often puzzled us by its similarity to that of varioloid. Of course these may be simply epidemic modifications, though we are inclined to think that the extreme watery condition of the eyes, with sore throat and severe febrile symptoms, coming on with the suddenness of scarlatina, is pathognomic.

The treatment of the exanthemata is thorough and clear, in fact we are well pleased with the common sense view the author takes, so different from most of the English writers, especially as regards diet. We note fewer of the quasi-patent-medicine style of food and drugs recommended; the *mistura salina* (?) of Guy's Pharmacopœia is used for diarrhœa in teething, upon the word of Dr. Pavy.

In Chapter XV. we return once more to the babies, and engage in the study of diarrhœa, and the author's sound views upon its treatment made us almost wish he had published this chapter separately, that it might have had a chance of wider reading. He is a believer in castor oil, and is opposed to the deadly chalk mixture; in fact, he strikes the keynote in the following:—

"As a rule astringents are objectionable in the early stage of diarrhœa, which may continue in spite of them, unless other precautions are taken. If the motions contain mucus and are slimy, and there is any escape of blood or redness about the anus, chalk mixture, catechu, acids, and bismuth will be of no service, but in their stead the remedies we have pointed out, especially castor oil paste[?] and alkalies, with an alterative or sedative, as the case may appear to warrant."

In choleraic diarrhœa he recommends morphia, brandy, and sulphuric acid, which we know by experience to be of great value.

Although the writer tells us that diphtheria "bears an affinity to the exanthemata in the fact that it chiefly attacks the young, and that it is a contagious and epidemic disorder characterized by a specific inflammation," etc., we still find it as usual placed with the diseases of the respiratory apparatus; if such be the proper place for this disease, the exanthemata should be associated with the chapter on skin disease. If this affection and whooping cough were elevated to their proper position in the work, where the author states they belong, it would greatly simplify the special points laid down as indications for their treatment.

Our notice has reached such length that it is impossible for us to do justice to the best parts of the book, which we have not noticed. We have called attention to only some of the weaker points, most of which are matters that relate rather to mothers' guides than to scientific textbooks.

On the whole, we must confess we are pleased with this book, and can heartily recommend it,—a recommendation which it does not appear to need, as it has already reached its second edition. The article on the true *diseases* of children, those of the pulmonary, circulatory, and renal apparatus, and the nervous system, are in many parts exhaustive and well written, least so probably are those connected with brain and nerve disease. The writing is clear and forcible and to the point, and were it not for the wearisome description of so much already well-known matter, the practitioner, even be he one who has been through the advanced course of the study of medicine, would find in its reading pleasure and profit.

For this country, we do not think it could ever form the useful textbook, or rank as high as Meigs and Pepper, nor can we for a moment place it beside the other thoroughly American, and masterly work, that of Dr. J. Lewis Smith. As an aid to diagnosis, it is inferior to Meadows's Tanner, but as a guide to treatment it leads the works of the English school. The author has attached some useful formulæ, but we note the absence of decigrammes and centigrammes, and only find our old time comprehensible prescriptions, for which we again thank him. J. M. K.

ART. XXIX.—*Transactions of the American Ophthalmological Society. Sixteenth Annual Meeting.* 8vo. pp. 173. New York, 1880.

THE first paper is by Dr. DAVID WEBSTER, of New York, *On sympathetic Inflammation following Operations for Cataract*, in which he reports eleven cases from various sources, with the following summary:—

“In four cases both eyes were lost. In one case the eye causing the sympathetic inflammation was lost and the sympathetically inflamed eye was badly damaged. In one case the eye causing the sympathetic inflammation was lost, and the sympathetically inflamed eye recovered in good condition. In one case the eye causing sympathetic inflammation retained useful sight, and the sympathetically inflamed eye was afterwards operated on, and gave promise of a good recovery, when the patient died, and a knowledge of what the ultimate result would have been was prevented. In two cases both eyes recovered in good condition. In one case the eye sympathetically inflamed was lost, while the eye causing the sympathetic inflammation retained good vision.”

Several other members of the society spoke of cases that had occurred in their practice or come to their notice.

Dr. CHAS. S. BULL, of New York, presented a *Contribution to the Pathology and Treatment of Vascular Tumours of the Eyelids*, with reports of two cases, in one of which, microscopical examination showed that the tumour had been a dermoid cyst transformed into an angioma. He strongly insists upon the superiority of excision over other methods of treatment for the ordinary vascular tumours met with in the lids.

Dr. F. B. LORING, of Washington, describes a *Peculiar Anatomical Development of one of the Central Arteries of the Retina*. It consisted of an annular enlargement of the lower branch of the central artery a little below the margin of the disk. There was nothing else abnormal in the fundus, and vision was not affected.

Dr. ARTHUR MATHEWSON, of Brooklyn, reports *A Case of Ectropion treated successfully by Wolfe's Method, the transplanted piece of Skin*

measuring three by one and a half inches. The deformity, for the relief of which the operation was performed, was the result of an extensive burn of the face and the forehead. The upper eyelid was completely everted and its ciliary margin drawn upward on the supra-orbital ridge. The cicatrix was so extensive that a flap could not be formed from the surrounding tissues. A piece of skin was taken from the side over the seventh rib and applied to the raw surface formed by dissecting the lid free and bringing it down in place. Two sutures only were used, and the flap was covered with a transparent plaster of gold-beaters' skin fastened at the edges with collodion, a piece of soft muslin smeared with vaseline and a compress of absorbent cotton, held in place by a bandage. The dressings were left undisturbed until the fourth day, when the transplanted piece was found in perfect coaptation and apparently united by first intention. There was slight sloughing three or four weeks after the operation, but at least two-thirds of the flap remained entire.

A case very similar to the above is reported by Dr. LUCIEN HOWE, of Buffalo, N. Y., in a paper on *The Treatment of Ectropion by Transplantation of Skin*. The transplanted piece of skin, which measured $3\frac{1}{8}$ by $1\frac{3}{8}$ inches, was taken from the inner aspect of the forearm. To avoid delay it was dissected up by an assistant while Dr. Howe was engaged in freeing the lid. Only a small strip along the edge of the flap, two lines in breadth and four in length, was lost. There was a superficial slough over the entire surface, involving only the epithelial layer, which was immediately reproduced. The author gives a brief sketch of the history of the operation. He thinks that the flap should be made at least one-third larger than the wound to be covered. It had contracted, in his case, at the end of two months from $3\frac{1}{8}$ by $1\frac{3}{8}$ inches to $1\frac{1}{2}$ by $\frac{3}{8}$.

Dr. ALBERT G. HEYL, of Philadelphia, contributes a paper on *Intra-Ocular Lipoma*. He defines lipoma as the "name applied to a state of the blood characterized by the presence of free fat in the serum of the blood," and describes the ophthalmoscopic appearances and the peculiar condition of the blood in a case of diabetes mellitus, which was the subject of his paper. There was incipient cataract in each eye. The nucleus of the lens was opaque, and the cortical structure, though sufficiently clear to admit of examination of the interior of the eye, was traversed by radiating spikes of opaque lens tissue. The fundus was free from any evidence of inflammation either old or recent. The retinal arteries and retinal veins were of the same colour, which was described as light-salmon. The vessels appeared to have about twice the normal diameter. For this latter phenomenon the author suggests the following explanation: according to Jaeger, the blood-stream in the retinal vessels consists of an axial current of blood corpuscles surrounded by a peripheral current composed of the plasma of the blood, which plasma is, under ordinary circumstances, invisible in ophthalmoscopic examination, but in the case described was made visible by the presence of fat.

The blood drawn from the patient presented a peculiar appearance:—

"On pricking the finger, a drop of blood would escape, having very much the colour of a piece of pink coral, followed by a thick whitish fluid, of the colour and consistence of an oil emulsion. On examining this with a low power, 250 diameters, a few blood corpuscles could be seen upon a dim, misty background, barely discernible. Examination with a power of about 600 showed the granular nature of this background, and examination in various ways left no doubt but that it was fat in a finely divided state."

The author suggests that the interruption of the circulation resulting from occlusion with masses of fat may be connected with the causation of diabetic cataract and retinitis.

Dr. W. S. LITTLE, of Philadelphia, presented a *Tabular Report exhibiting the Position of the Axis of the Cylinder in Simple, Compound, and Mixed Astigmatism; the Myopic and Hypermetropic Forms compared; with Remarks*. He suggests a connection of the usual position of this axis, approaching the horizontal in myopic and the vertical in hypermetropic astigmatism, with the causation of the defect.

Dr. LITTLE also reports a *Case of Traumatic Paralysis of the Superior Oblique Muscle, with treatment*, and one of *Partial Paralysis of the Inferior Oblique, with treatment*. The former was the result of a fall, in which the head was struck. As there was no other paralysis, and but slight cerebral disturbance, Dr. L. considered the paralysis due to direct injury of the fourth nerve, probably by effusion. The patient was treated with iodide of potassium, and afterwards with strychnia and the Faradic current, and the diplopia was relieved by the use of prisms, gradually diminished in power as the muscle recovered its function. The first prism used was one of 20° , and the last one of 3° . The patient had finally but little inconvenience from diplopia, without a prism.

The cause of the paralysis in the inferior oblique case was not known. The diplopia was relieved by a prism of 6° .

Three *Cases of the Laceration of the Eyelids* are reported by Dr. H. D. NOYES, of New York, illustrating some practical points in treatment. Dr. Noyes also reports a case of *Glioma of both Eyes; Removal; Recurrence; Death; Autopsy*. When first seen the patient was one year old, and the peculiar glistening reflex had been noticed, by the parents, in the left eye six months before. The growth was also distinctly visible in the right eye. Eighteen months afterwards the left eye was enucleated in Germany, but in a few months the disease returned in the orbit, which was soon filled by a secondary growth. This was removed as thoroughly as possible by Dr. Noyes, but a part of the mass was left at the apex. Death resulted in a few weeks from extension of the disease to the brain. The disease had advanced slowly in the other eye. Microscopical examination of the brain showed that the pia mater was the structure chiefly involved. The intra-ocular growth in the right eye was composed of the same material as that found in the orbital tumour. Sections of the optic nerve of this eye, made at various points from the lamina cribrosa to its extremity, showed the same cell infiltration as found in other parts, though the sclerotic was still sound.

Dr. Agnew, of New York, spoke of a case of glioma in which he enucleated both eyes in 1874, and reported the patient as still living, being now seven years old.

Dr. CHAS. J. KIPP, of Newark, N. J., contributes a short paper *On Keratitis from Malarial Fever*—a large number of cases of which have come under his observation. It is commonly developed in the early stage of the intermittent fever. In some of his patients every fresh attack of the fever was followed by the corneal affection. One eye only is usually affected. The disease bears a close resemblance to the phlyctenular form, but the ulcers show a greater tendency to spread superficially. Spontaneous perforation of the cornea did not occur in any of his cases. The affection is a painful one, and the process of repair is slow. The local remedies found most useful are the pressure bandage, warm fomentations, and

atrophia; while quinia, iron, and arsenic are administered internally. This disease is ignored in modern ophthalmological literature, and Dr. Kipp has been unable to find any description of it in the older works.

Dr. H. KNAPP, of New York, reports *A Case of One-sided Complete Blindness from Ischæmia Retinæ, ending in perfect Recovery*. The patient was an unmarried lady, 30 years of age, who had been exhausted by constant nursing of her father for seven months, and was much distressed by his recent death. Five days before, she had noticed that the sight of the left eye was completely obscured from above downwards to the extent of the upper half of the visual field. Four days later the lower half became darkened in the same manner. The pupil of that eye was slightly dilated, and did not respond to light when the other eye, the pupil of which was normal, was covered. The optic disks of both eyes were abnormally pale, and both arteries and veins were smaller and less numerous than usual; the ophthalmoscopic appearances were otherwise normal. Complete recovery resulted in a few weeks under the use of iron, generous diet, milk punch, and fresh air. Dr. K. was convinced that the case was not one of hysterical simulation.

Dr. KNAPP also reports *Eight Sclerotomies for Glaucoma*, and gives the following as his views as to the indications for the operation:—

“1. In cases of simple glaucoma with a narrow field of vision and marked excavation, I would prefer sclerotomy to iridectomy, and if both eyes are affected, operate on one at least by sclerotomy.

“2. In megagophthalmus (buphthalmus) congenitus I would only perform sclerotomy, since in such cases iridectomy is almost always fatal to the eye.

“3. In glaucoma of younger persons, i. e., below 35 years of age, and in cases of hemorrhagic glaucoma, I would prefer sclerotomy to iridectomy, since the results of the latter operation in these cases are mostly unfavourable.

“4. Encouraged by the experience derived from the above-related operations, and on the strength of the statements of Wecker, Mauthner, and others, I consider it legitimate to try sclerotomy also in cases of acute glaucoma. If it prove equally curative as iridectomy, it will have a decided advantage over this operation by leaving the pupil round, small, and central.”

Dr. G. C. HARLAN, of Philadelphia, contributes a *Note on a Case of Unusual Acuteness of Vision, with Circles of Diffusion*, as a striking illustration of the well-known, but sometimes forgotten fact, that the results of our usual method of testing the accommodation are far from accurate.

Dr. E. WILLIAMS, of Cincinnati, O., reports *Two cases of Cysts of the Iris*, illustrating the curability of cysts of the iris by surgical operation, and the destructive tendency of such tumours when left to themselves. One was the result of the presence of a small bird shot in the iris, where it had been lodged for eight years. What the patient called “a very small blister near the inner border of the pupil” had been noticed; but about eight weeks before the case came under observation, there were pain and redness of the eye, and the minute tumour increased to the size of a bean. As there was no vision in the affected eye, and its fellow was suffering from sympathetic irritation, enucleation was at once performed. A plate representing a microscopic section of the cyst accompanies the paper.

The other case was that of a child, 9 years of age, whose iris had been injured two years before by a piece of slate. The cyst was removed by iridectomy, and useful vision resulted. In the discussion that followed there was a general consent that these cysts originate in the epithelial layer of the iris.

Dr. C. R. AGNEW, of New York, reports *Three Cases of Persistent Pupillary Membrane*, and contributes a paper on *The Insufficiency of the Ophthalmoscope as the Sole Test of Errors of Refraction*, in which he contends that it is often impossible, however skilful the observer may be, to determine the refraction accurately with the ophthalmoscope alone, without the use of a mydriatic. A strong point is made by giving the history of a case in which several prominent ophthalmic surgeons had committed themselves to different opinions, none of which corresponded to the real facts as afterwards developed by atropia.

Three cases of *Neuritis after Measles* are reported by Dr. O. F. WADSWORTH, of Boston. Neuritis is a rare sequela of measles, and is to be considered rather as the result of a complicating meningitis than as a direct consequence of the measles.

Dr. JOHN GREEN, of St. Louis, Mo., reports a *Case of Detached Retina treated by Hypodermic Injections of Muriate of Pilocarpin*, with temporary improvement. Dr. Green also exhibited a *Combination Set of Trial-glasses, and a New Trial Frame*, the object of which is to "reduce the glasses in the trial-case to a comparatively small number, and those such as can be readily and cheaply procured." The sets can be obtained of Hunter, of New York, or Queen, of Philadelphia.

Dr. E. G. LORING, of New York, presented an instrument called *The Keratometer—a New Instrument for Measuring the Curvature of the Cornea*. It "consists of a metal disk in which are set a number of plane convex lenses of various curvatures, on the plane or posterior surfaces of which the representation of the iris is painted." The measurement is made by comparing the image of a window-sash formed on the cornea with that of the same object formed on the surface of the lenses, whose radius of curvature is known—"by matching the image of the real with that of the artificial eye." Dr. L. claims that a difference of less than one-hundredth of an inch in the radius of curvature, can be detected in this way.

Dr. WM. THOMSON, of Philadelphia, describes *An Instrument for the Detection of Colour-blindness*, which he has devised for the examination of the employes of the Pennsylvania Railroad. The instrument has been described in the *Medical News and Abstract* for December, 1880.

Dr. H. D. NOYES, of New York, showed a *Modification of Loring's Ophthalmoscope*, by means of which the series of small lenses can be more conveniently and quickly brought in succession before the eye of the observer. This is accomplished by a system of cog-wheels.

An Improvement in Concave Spectacle Glasses of High Power, suggested by Dr. JOHN GREEN, of St. Louis, consists in "making the principal refracting surface small, say two centimetres in diameter, and grinding it upon one side only—that turned toward the eye—of a double-convex, double-concave, plano-convex, plano-concave, or plane glass." Glasses ground in this way are very light, and a single grinding tool may be made to produce a great variety of lenses.

An Acute Glaucomatous Invasion, following closely upon a Single Application of a very weak preparation of Duboisia, is reported by Dr. JOHN GREEN, of St. Louis.

Dr. ED. S. LORING, of New York, describes *An Improved Operation for a New Pupil after Cataract Operations*. It is practically an iridotomy performed with a very narrow knife instead of with scissors. The knife is entered at the corneo-sclerotic junction, and passed entirely across the

anterior chamber. The point is then boldly depressed, and the membranes divided freely up to the attached margin of the iris.

In *A modified Operation for Discission of Soft Cataract*, Dr. JOHN GREEN, of St. Louis, uses the sickle-needle cystotome, and makes a linear incision in the capsule. Dr. Green also reports a *Case of Nucleus-like Bodies in the Lenses of a Child, escaping after Discission*.

Dr. H. W. WILLIAMS, of Boston, gives the result of his experience with *Optico-ciliary Neurotomy*. In most of his cases the results have thus far proved as satisfactory as those of enucleation, and he considers a reunion of the divided ciliary nerves as exceedingly improbable. In two instances where bits of steel had remained in the eye—in one case fifteen, and in the other two years—the operation gave immediate relief to urgent symptoms, which, some months afterwards, still continues.

Dr. H. D. NOYES reports a *Case of Buphthalmus, with Central Anterior Synechia, cured by total removal of the Iris*. The condition of the eye was the result of a wound by scissors received several years before. There was extensive bulging of the anterior half of the eye, with great thinning and stretching of the ciliary region. The iris was pressed against the inner surface of the cornea. Two or three months after the operation the globe was of rather less than normal size.

Dr. S. D. RISLEY, of Philadelphia, gives an illustration of *Dermoid Cyst of the Cornea*.

Dr. JOHN GREEN, of St. Louis, gives the result of his experience with the *Operation for Entropion*, described by him at the Fifth International Ophthalmological Congress in 1876. He has made several slight modifications in the operation as described in the proceedings of the Congress.

A *Photograph of the Fovea Centralis of the Retina*, presented by Dr. O. F. WADSWORTH, of Boston, ends the volume. The photograph was taken by Prof. J. W. S. Arnold, of New York, directly from a microscopic section.
G. C. H.

ART. XXX.—*Lectures on Diseases of the Nervous System, especially in Women*. By S. WEIR MITCHELL, M.D., Member of the National Academy of Sciences, etc. etc. 12mo. pp. 233. Philadelphia: Henry C. Lea's Son & Co., 1881.

THE volume before us, dedicated to Hughlings Jackson, is somewhat discursive, and represents the gist of thirteen lectures upon nearly as many troubles or lesions of the nervous system, in females, as the title indicates. The cultivated colloquial style assumed by the author becomes the vehicle of a mode of thought and expression peculiarly felicitous in the case where instruction is sought to be conveyed in precise terms about matters in which the experiences of the patient are oftentimes in illicit commerce with the imagination, and the singular realities of etiology and history seem to deck themselves out in the attire of romance. Nor is the impression wanting that nowhere does the locutor appear to better advantage than in those strong points upon which he has bestowed so much attention and care.

The first lecture is occupied with the paralyses of hysteria; and the second with hysterical motor ataxia and hysterical paresis. The third treats of the mimicry of disease, as does also the fourth; then follow unusual

forms of spasmodic affections in women, tremor, and chronic spasms. Chorea, and the habit of chorea are made the subjects of the seventh and eighth lectures, followed by disorders of sleep in nervous and hysterical persons; by vaso-motor and respiratory disorders in the nervous or hysterical; by hysterical aphonia and gastro-intestinal disorders of hysteria; and, finally, lecture thirteenth recalls a familiar little volume entitled "Food and Rest," by Dr. Mitchell himself. The burthen of this lecture is the treatment of obstinate cases of nervous exhaustion and hysteria by seclusion, rest, massage, electricity, and full feeding.

In general we would accept the declaration of the author that originality deals in two ways with the matters under discussion, first as to new modes of viewing and studying well-known diseases, and second, as, in the case of Dr. Schliemann, to the unearthing of "subjects hitherto slighted in medical literature, or which are almost unknown to it." As a matter of formal presentation rarity of chorea in the black race, and its infrequency in the mulatto, may be referred to as illustrating the latter. But that which will naturally claim high originality is the system of charts introduced in connection with the study of attacks of chorea, as exhibiting or asserting a relation between their frequency and average relative humidity, state of barometer, temperature, rain fall and snow, and representing the months of onset in 170 cases, in a mean of five years; a table representing the number of storm centres passing within 750 miles of Philadelphia, and within 400 miles; and another showing the singular correspondence of the heat curve, 1871 to 1880 inclusive, culminating at the beginning of July, and that of infantile palsy cases culminating at the opening of August. And we might here, with advantage, introduce a conclusion of the author which, in connection with storms, it seems to him justifiable to draw, "that no single fraction of a storm explains satisfactorily the rise and fall of the chorea line, but it is where these are taken collectively, as in storm line, that the greatest resemblance is seen."

When we use the word original, however, we would not insist upon the total newness of the whole matter of the foregoing averages and deductions as applied to the volume before us, for Dr. Mitchell, in this *Journal*, in April, 1877, made it appear that "the area over which a storm has its influence is strikingly alike in chorea and in neuralgia," but we would give him a credit which he deserves, of exacting from various departments of knowledge, and especially through the employment of instruments of precision, most varied information about matters not hitherto supposed to be cognate, and of reducing the inchoate mass to limits of form and number which strike the sense.

In sum we would not withhold from this charming little work its due meed of praise, regarding it as very clever, its cleverness in many places mingled with wisdom, as offering food for thought, and as being remunerative for its perusal.

The typographical style and execution of the volume are greatly to be commended.

C. J.

ART. XXXI.—*On Anchylosis, and the Treatment for the Removal of Deformity and the Restoration of Mobility in Various Joints.* By BERNARD E. BRODHURST, F.R.C.S., Surgeon to the Royal Orthopædic Hospital, etc. Fourth edition, 8vo., pp. 100. London: J. & A. Churchill, 1881.

THIS volume is written from the standpoint of a practical surgeon, and deals with the clinical symptoms and the treatment of stiffened joints. Its main object seems to be to direct the attention of the profession to the fact that anchylosis, when it is not bony, is best treated by forcible flexion. This method of manipulation was advocated by Mr. Brodhurst twenty-four years ago, previous to which time gradual and forcible extension were the usual means employed in attempts to restore stiffened and deformed joints. At the present time every true surgeon appreciates the all-important advantage of forced flexion as the first step in liberating articulations impaired by false anchylosis. The author in successive chapters treats of pathology, false anchylosis, diagnosis, treatment of false anchylosis, bony anchylosis, and treatment of bony anchylosis. As might be expected, the portion devoted to false anchylosis, its diagnosis and treatment, occupies the bulk of the book. This part is illustrated by reports of twenty-five cases selected from the great number treated by the author. The manner in which these cases are detailed, is often deserving of adverse criticism, for a large portion of a page is at times occupied by a garrulous account of circumstances that have no medical bearing whatever. A marked illustration of this will be found on page 57.

The chapter on pathology gives many important suggestions to the reader, but the definition of anchylosis is not a perfect one, since it seems to imply that in all kinds of anchylosis there remains a synovial membrane. This of course is not an idea which the author intends to convey, as is shown by a subsequent sentence, which states that in bony anchylosis the soft structures of the interior of the joint are removed. His statement that in false anchylosis motion is impaired but not wholly lost, will not apply to the few cases of fibrous anchylosis where motion is not perceptible, though the fibrous character of the stiffened joint is proved by manipulation under ether. Bony anchylosis is regarded as a natural change in certain parts of the skeleton in old age (page 2). May this not be due to chronic inflammatory changes rather than to a physiological process of old age? Mr. Brodhurst says that primary synovial inflammations are comparatively rare in childhood, which age is especially obnoxious to strumous affections. Synovitis certainly, however, occurs as the first result of traumatism in children. He does not appear to agree with Sayre as to the non-scurfulous origin of joint disease in children, but lays considerable stress upon the constitutional etiology of such disease.

The disastrous results of gonorrhœal rheumatism are enjoined upon the reader. The author regrets the use of the term gonorrhœal rheumatism, and states that though suppuration never occurs, fibrous anchylosis is a frequent sequel, and therefore makes the disease one of great practical importance. The pyæmic nature of this affection does not receive discussion at his hands.

In the chapter on diagnosis no mention is made of the fact that manipulation of a joint, the subject of bony anchylosis, will not be followed by inflammatory reaction, as will be the case if a false anchylosis is examined

in the same manner. The conclusions derived from his experience in breaking up fibrous ankylosis, which are given on pages 37-47, are exceedingly interesting. They may be given here in abstract. Anæsthesia should be complete, tense muscles and fascia should be divided, and the punctures allowed to heal before forced flexion is applied; moderate force alone should be used; the adhesions are to be ruptured by flexing the limb; and the surgeon is to be satisfied with rupture of the adhesions at the time of operation, without attempting restoration of the limb until inflammatory reaction has somewhat subsided. Some of these precautions are doubtless stated too dogmatically, for their necessity is contrary to the experience of many operators; but it is well for the author, perhaps, to enforce over cautiousness upon those undertaking these procedures for the first time.

The prominence given the American names, Barton, Brainard, and Sayre, in the chapter on the treatment of bony ankylosis, is agreeable to those who believe in the practical character of American surgery; but not enough credit is given, perhaps, to his own countryman Adams, who has done so much to advance the position of subcutaneous osteotomy as a treatment for bony ankylosis with great deformity.

The style and arrangement of the monograph are hardly logical, as is shown by a tendency to repetition, which annoys the reader by suggesting that the author either thinks his audience dull of comprehension, or is uncertain as to what he himself has already written. On pages 10 and 20, his statements regarding gonorrhœal rheumatism are almost contradictory; and the insertion of the history of the same patient, quite at length, in two distinct places seems unnecessary. The practical character of the book, however, should atone for many literary inelegancies. J. B. R.

ART. XXXII.—*Photographic Illustrations of Cutaneous Syphilis.* By GEORGE HENRY FOX, A.M., M.D., Clinical Lecturer on Diseases of the Skin, College of Physicians and Surgeons, New York, etc. Numbers 1 to 6. New York: E. B. Treat.

THE first fasciculus of Dr. Fox's atlas includes three views of the erythematous syphiloderm, and one each of the pigmentary, and leucodermic varieties. The arrangement of the eruption, that is its general grouping, is well shown in the first mentioned, while the two latter are extremely interesting representations of unusual forms and results of the disease. The second fasciculus includes pictures of the lenticular and miliary papular lesions, of the papulo-squamous eruption, and of another form of papular rash. The third of these, that of the papulo-squamous eruption, is one of the best photographic illustrations which we have ever seen, and is unusually happy in its colouring. The third fasciculus includes photographs of the papular circinate, papulo-squamous, papulo-pustular, and pustular eruptions. In all of these, the grouping of the lesions is well shown, but their individual character is very imperfectly demonstrated, so that he should be a rash diagnostician who would be willing to affirm the nature of the lesion in every case without reference to the name given below. The fourth fasciculus contains representations of papulo-pustular and pustular lesions which are very well portrayed but are a little wild in

colour. The photograph of onychia, which closes the fasciculus, would better represent the effects of raspberry picking than those of syphilis. The fifth fasciculus is admirable, the representations of the moist papule, and particularly of the papulo-squamous lesions of the palm being wonderfully good. A picture of non-syphilitic disease, "hydroa or pemphigus iris," of the back and front of the hand brought in for comparison is also an admirable picture. The representation of palmar and plantar lesions is continued in the sixth fasciculus forming a unique series of pictures of these often-puzzling eruptions. A photograph of the tubercular syphiloderm ends this fasciculus of which, as of the others, with the exceptions above noted, we have but little to say except in praise. These photographs are far in advance of the series of skin diseases recently published by Dr. Fox, and we think mark a decided progress in the photographic representation of diseases of the skin. The letter-press is crisp, clear, and agreeable reading. It is not simply a description of the plates but a short treatise on syphilis.

A. V. H.

ART. XXXIII.—*A Manual for the Practice of Surgery.* By THOMAS BRYANT, F.R.C.S., Surgeon to, and Lecturer on Surgery at, Guy's Hospital, etc. Third American from the Third Revised and Enlarged English Edition. *Edited and Enlarged for the Use of the American Student and Practitioner.* By JOHN B. ROBERTS, A.M., M.D. Pp. 1005. Philadelphia: Henry C. Lea's Son & Co., 1881.

ONLY two years ago the second American edition of this book appeared and received due notice in the April number of this *Journal* for 1879. The publication of the third American from the revised and enlarged English edition with notes and chapters by an editor of our own country is a trustworthy evidence of the professional appreciation of the good qualities of this manual. The charges that have repeatedly been made against the diction and literary style of the author have justly failed to counteract the advantages of his production as a condensed yet comprehensive exposition of the principles and practice of surgery. He who begins the study of medicine accomplished in literary attainments will be content with a proper treatment of the special subjects of a text-book, regardless of literary grace; and the latter would not materially influence the standing of students devoid of academical training. To advanced students and practitioners whose inclination or professional requirements lead them to seek more profound surgical knowledge than is ordinarily demanded, many other volumes of deeper research and larger scope can be recommended.

Numerous and valuable are the additions of the American editor, of which those of but few lines are often as important as entirely original chapters. The terse advice to open acute abscess early "to hasten the cure, lessen the tissue destruction, and shorten the duration of suffering," and to use Martin's bandage in preference to strapping an ulcer is of more value to the novice in the profession than the chapters on litholapaxy and paracentesis of the pericardium.

While in London in 1877, the reviewer had an opportunity of witnessing Mr. Bryant ligate the common femoral in a young woman afflicted with elephantiasis of both lower extremities. The operation, practised

on the right side, was followed by gangrene of the foot and death. Prior to the adoption of so dangerous a procedure as the deligation of the main artery of a limb, Dr. G. Fischer's suggestion should always be followed, *i. e.*, a prolonged compression, digital or instrumental, should be employed. In two instances we have known this practice to yield as good results as could be expected from the more hazardous interference. It is difficult to comprehend in what manner Dr. Morton's excision of a part of the nerve-trunk of a limb, which is the seat of an elephantiasis, will permanently effect the disease.

So much has recently been accomplished, especially in France and England, in the furtherance of our knowledge of localized functions of brain, that it causes just astonishment to find only cursory mention of the researches of Charcot, Ferrier, and Lucas-Championnière, in a treatise that is supposed to be abreast with the progress of the times. The art of surgery has so far advanced that, with the proper antiseptic precautions, exploratory operations on the skull in brain injuries indicated by certain localized manifestations are not only justifiable but are positively demanded to save life or function, if even the external injury appears only trivial in character. Indeed the conversion of a simple into a compound fracture is even strongly advised by the American editor "to complete the understanding of the nature of the injury. It is felt that too great stress can hardly be laid upon the importance of this exploratory incision in severe injuries of the head with suspected fracture of the cranium." Notwithstanding this belief of the author, no rules to regulate operative interference and determine the seat of the operation are given.

Intimately associated with the operative treatment of pericardial effusions is the name of Dr. John B. Roberts, whose production on this subject was noticed in the April number of the *Journal* for last year. Several relevant paragraphs have been added to the volume in review, due consideration being given to the methods of aspirating the pericardium, the precautions to be observed and the results that have hitherto been obtained. The mortality of the operations recorded seems rather high ($62\frac{2}{3}$ per cent.), but this is materially increased by the inclusion in the death column of a number of cases that lived several weeks after the operation, death resulting not from the operation, but from the disease for the relief of which it was performed.

Perhaps the most important part of a work on practice is that devoted to the treatment of cases of emergency that so often call for immediate relief. The radical treatment of urinary retention does not often require the instantaneous performance of a grave operation, but the distended bladder must be relieved if but temporarily. English surgeons still cling to the rectal tapping if the attempt to use the catheter prove abortive, notwithstanding the fact that when performed by a beginner it is an operation likely to be followed by serious results. Indeed Mr. Bryant endorses the advice, "that in all cases of retention of urine from stricture in which relief cannot be given by means of rational and not forcible catheterism, the operation of puncturing the bladder through the rectum should be performed." Although Sir Henry Thompson alludes to the "ingenious proposal" of Dieulafoy to aspirate the distended bladder, it is a practice that has found few followers among our English *confrères*. In this country we believe Prof. Whittaker, of Cincinnati, first successfully relieved a patient suffering from vesical retention by repeated aspirations until an operation for permanent cure could be performed.

Thanks to German surgeons and pathologists particularly, the attention of the profession has in recent years been largely directed to the nature of the chronic diseases of the joints followed by destructive lesions. With few exceptions English writers fail to see in these affections more than a "low form" of inflammation in which tuberculous deposits are only occasionally encountered. Indeed Mr. Bryant considers them of such rarity that preparations containing them are to be regarded as pathological curiosities. How much at variance this view is with that entertained on the Continent appears on perusal of the recent communications of König, Schüller, Lannelongue, and others. According to these authorities the vast majority, indeed if not all chronic articular affections with destructive tendency, are tubercular in origin and in a certain measure independent of the traumata to which they are usually attributed. Here, as elsewhere, the truth will probably be found between these extreme views, although experimental research appears to have established the fact that in animals at least fungous degenerations of the joints cannot be induced without a preparatory infection of the system with tuberculous virus. It certainly is true, however, that a careful inspection, macroscopic and microscopic, will reveal the existence of tuberculous deposits in the form either of caseous masses or miliary nuclei in the soft as well as in the firmer structures of the joints that are the seat of fungous degeneration. It is to be regretted that clinically the differentiation of the various forms of chronic inflammations of joints is as yet beyond our diagnostic powers.

Besides the numerous and judicious paragraphs and chapters inserted into the text by the American editor, the edition before us has been enriched by sixty-three original illustrations of uniform merit. Altogether the improvements of this volume on its predecessors are sufficiently numerous to have warranted the publication of this before the appearance of another English edition.

J. R.

ART. XXXIV.—*Transactions of the Obstetrical Society of London*. Vol. XXII., for the year 1880. 8vo. pp. 314. London: Longmans, Green & Co., 1881.

OF all the special medical societies of Europe, there is perhaps no one that exceeds in activity the one whose annual volume of Transactions lies on our table, and is always a welcome visitor of the spring season. With an enormous list of members, embracing some who have made themselves famous in two hemispheres and are among its most active contributors, it is not to be wondered at, that its discussions are often of great value, quite voluminous, and occasionally more practical than the articles which have given rise to them. In reading these discussions we are often struck with the fact, that the most active gynaecological and obstetrical practitioners of London generally manage to be present at a large proportion of the ten monthly meetings held during the year. The *very busy men* of the great city appear to be able to find time to attend, and to take an active part in the meetings. We could cite a dozen whose names are repeatedly found in the indexes of the Transactions, and who must be quite as much occupied with attending the sick as some of our society members, who are "*really so busy that they cannot possibly find time to attend.*" Like the bee-hive, the inhabitants of which are divided

into *drones* and *workers*, so our societies consist of a few who do all the work, and a large number who but seldom write a paper or attend a meeting. We could profit much in our country by imitating the action of London's busy physicians, and learning the secret of their managing to get to these meetings. "Where there is a will there is a way," will no doubt explain much that is otherwise almost unaccountable. No doubt Drs. Barnes, Hicks, Playfair, Gallabin, and their co-workers find it pays to work for science quite as satisfactorily as it does those who cannot spare the time to do it, or think they cannot. It sounds well to appear to be so run down with work; but who will get the greater credit, the really busy man or the claimant who may possibly not be? We need the spirit of the leading medical society men of Europe to wake up the dormant energies of men in America whose experiences ought to be used for the better education of their younger and less occupied brethren in the profession.

As several of the articles contained in this volume have been already given in abstract in the pages of this *Journal*, or of the *Medical News and Abstract*, we shall confine our attention to such papers as have not been noticed.

Rupture of Fallopian Tube and Death by Hemorrhage. Case occurred to Mr. J. KINGSTON BARTON, and was decided by a committee who examined the specimen to have been due to a Fallopian pregnancy and the giving way of the cyst, at about a month of gestation. The patient was 35; married two months; was menstruating at the time of the rupture. The chief value of the case lies in the facts, that the impregnation was early after marriage; that rupture was at an early period; that the woman had been menstruating regularly; and had been four days in this condition when the rupture took place. The right ovary showed a well-marked *corpus luteum*. There was no ovum discovered, or *membrana decidua*.

Hot Infusion of Cotton-plant Leaves, as a Galactagogue. Dr. IZETT W. ANDERSON, of Kingston, Jamaica, W. I., one of the successful American Cæsarean operators (1863), recommends very highly this remedy, as the most active he has ever met with, after an experience with it of seventeen years. Six or eight fresh leaves are infused in a cup of boiling water carefully covered, and four or more of these cups are taken in twenty-four hours. It has long been a favourite domestic remedy with the Jamaica negroes. He was first led to discover its value by seeing the lacteal secretion restored by its use in the woman upon whom he had performed the Cæsarean operation, and whose breasts were destitute of milk when he ceased his attendance at the end of forty-six days. The value of this remedy might easily be tested in a large portion of the United States, as the plant will grow readily, where the season is not long enough to mature the bolls; a fluid extract might also be experimented with.

Foreign Bodies in the Vagina. Two cases reported by Dr. CHARLES H. CARTER, of London. In No. 1, a girl of 17, the article introduced was a large sewing-machine reel, which had been in the vagina four years. The passage appeared to end in a short cul-de-sac; but close examination revealed the existence of a small opening, through which pus escaped. The cicatricial diaphragm was dissected out and the reel removed, which operation resulted in the formation of a ring of dense tissue. The girl married; became pregnant; was delivered after induced labour at eight months, by incising the band in three places; child died in six hours. A second labour at maturity ended favourably without assistance. In No. 2,

aged 20, also single, the foreign body was the metal cup of a drinking-flask, $2\frac{1}{4}$ inches long, and $1\frac{3}{4}$ inches in diameter at the top. This had been in the vagina two years; had perforated the bladder; and was heavily incrustated with phosphatic deposit, which also filled its cavity. The cup was removed and fistula closed by nine silver wire sutures—cure complete.

Specimens of Two Cases of Imperforate Anus were exhibited by Mr. ALBAN DORAN; one obtained from a male infant which died at the age of six months, in which the rectum opened into the urethra, and presented just above its terminus a distinct sphincter. The other was obtained from a girl who lived to the age of eleven, and in whom the rectum opened into the vagina, which latter became impacted with feces. To remove this an enema was given by a nurse, which set up an inflammation resulting in pelvic cellulitis and death. In neither case was it possible to open the rectum in front of the coccyx.

Multiple Calculi removed from a Prolapsed Bladder. The case was that of a woman of 61, having a complete procidentia uteri, with the bladder inverted and drawn out of the vulva; she was also the subject of rheumatoid arthritis, and much crippled thereby. Finding a number of calculi, and some quite large, Dr. A. L. GALABIN performed lithotomy in preference to dilatation. He removed 12 large calculi, and about 50 small ones, with a large quantity of fine sand; these calculi were chiefly of uric acid, the largest measuring $1\frac{1}{2}$ by $1\frac{1}{4}$ by 1 inch; and the weight of the whole $8\frac{3}{4}$ ounces. The uterus was returned after a complete procidentia of seventeen years, and secured in place by a large elastic ring pessary; the wound healed in ten days. No disturbance followed the operation, and perfect relief resulted. The preference of the knife was commended in the discussion that followed the report of the case.

Dr. J. BRAXTON HICKS reports a *Case of Abdominal Pregnancy in which concealed accidental hemorrhage occurred* about the seventh month of gestation, causing alarming symptoms, for which he performed laparotomy, cutting through the placenta in the operation, as it was seated upon the abdominal wall. Although not strictly a *primary* operation, as the fœtus was dead, the risk was equal, because the vascular character of the placenta was still unchanged, death having but just occurred. The placenta had been largely torn from its attachment by an effusion of blood between it and the abdomen, and the part still adherent could readily be separated by the hand. The woman sank and died shortly after the operation was completed. At the time of the operation her pulse was 140, and respiration 34; she had severe vomiting, and was in a cold sweat; the internal hemorrhage had lasted three hours, and the abdomen was tense and painful from the accumulation of blood. There was no bleeding after the operation. It is barely possible that an early removal of the fœtus might have saved the woman.

Dr. GRAILY HEWITT presented a *report on 67 Cases of Uterine Distortion or displacement* treated by him; which led to a prolonged discussion, extending into a second meeting, at which Dr. BANTOCK presented a set of remarks covering much more than the original paper, in the course of which he paid the following compliment to the late Prof. Hugh L. Hodge:—

“The mechanical treatment of uterine displacements received its first great impulse from the late Sir Jas. Simpson, to whose inventive genius gynecology owes so much. But it is to Dr. Hodge that we owe the greatest advance—viz., in the introduction of his most admirable instrument. Here let me say, in justice to that inventor, that men have exercised a great amount of ingenuity in small

things, and with smaller success, in their attempts to improve this instrument, until their name is legion. As Gaillard Thomas says, all the varieties of lever pessary now employed are modifications of his (Hodge's) original and most valuable idea, and act upon the principle which it developed. But because it has received a little extra bend here, or been straightened out there, or has been narrowed in one place, or widened in another, it must, forsooth, receive the name of the ingenious man who has effected this infinitesimal alteration in it. Where it has been tortured out of all semblance to the original, I willingly grant the inventor the honour of its fatherhood, with all the rights thereto appertaining. But I have no sympathy with such pursuit of notoriety, and such efforts as tend to deprive a man of that credit which is his due. The fact is, every case requires that the instrument be modified to suit the capacity and shape of the vagina, just as when one enters a bootmaker's shop he has to try on boot after boot until he gets one that fits. No one is more aware of the necessity of this modification than was Dr. Hodge himself."

It is not necessary to say that Dr. Bantock is an advocate of the pessary in the treatment of uterine displacements. He employs the Hodge form, made of pewter, and exhibited one that had been worn continuously for twelve months which was only very little tarnished. He also recommends the intra-uterine stem pessary as essential in obstinate cases of ante- and retroflexion of the uterus. He had never seen the cradle pessary accomplish any good result in the treatment of ante- and retroflexion.

Dr. Hewitt, in his paper, recommends rest in bed; nutritious diet; knee-and-elbow replacement; Hodge pessary for retroversion and retroflexion; cradle pessary for anteversion or flexion; and restoration of obstinate flexures by the introduction of the sound once or twice a week.

The discussion of this paper showed how various and often opposite are the views upon the management of uterine flexures and displacements held by leading gynecologists, according to their own successes or failures with different methods and appliances. An early disastrous experience will often condemn a new method with one, and the contrary recommend it to another of perhaps equal skill.

Rotatory Action in using the Forceps, is the title of a paper by WILLIAM STEPHENSON, M.D. What the author means by "rotation" of the head is not only the usual application of the term, but includes also flexion and extension. He opposes the teaching of traction in a *straight line*, and claims that the force exerted upon the head should be such as to favour and assist the changes of relation effected in a natural delivery by *flexion*, *rotation*, and *extension*; that not only should onward force be exerted, but in such a way that, at the same time, the relations of the head and pelvis in extrusion should be carefully maintained; and that the pendulum (improperly termed *lever*) action should be discarded.

"The general rule which I would suggest is: *With the onward traction, made in the direction of the axis of the pelvis, must always be combined such a movement of the instrument as will tend to impart to the head the rotatory movement which observation teaches us takes place at the particular stage of the mechanism.*" (Page 221.)

"To produce flexion, the chief reliance must be placed in the modification of the rule of traction. Rotatory movement must always be more or less combined with traction, but not from side to side, or now one way, now another. The head under the natural forces is never driven out like a cork from a soda-water bottle, nor does it wriggle out like an eel. Rotatory action must be imparted, but it must be made with steady purpose, in imitation of the natural mechanism." (Page 223.)

"So far as flexion or extension is concerned, we have always a guide in the direction of the sagittal suture, and the rule I would suggest is: *Whilst the force*

should always be exerted with strict attention to the direction of the axis of the pelvis, the line of traction should be in a slightly curved direction, the curve passing out of the line of the axis in a direction corresponding to that of the sagittal suture, towards the side where the forehead lies for flexion, to the side on which the occiput is for extension." (Page 223.)

"Much of the differences of opinion regarding the management of the forceps arise out of vague, inaccurate, or erroneous ideas regarding the mechanism of labour."

"The generally entertained conception of the movement whereby the occiput rolls forward is that rotation occurs on a vertical and central axis; that, as the occiput turns forward, there is a corresponding and equal turning backwards of the forehead; the movement is often spoken of as the 'turn of the face backwards into the sacrum.' This is not what happens. The movement is effected by the head rolling on the anterior frontal bone. . . . In occipito-posterior positions the movement is by a rolling and gliding motion. Here the forehead does move backwards, but never into the hollow of the sacrum; it always describes a smaller curve than that of the occiput. . . . The rotation then . . . is composed of a rolling on the anterior frontal bone, flexion of the head, and a rotation on the longitudinal diameter, whereby the posterior half moves more than the anterior." (Page 225.)

"It is simply impossible for the head to perform these movements when in the tight grasp of the blades, so that 'the head and the forceps make practically a continuous bar.' There must be some gliding between the blades. *When occipital rotation, therefore, is taking place, the grasp should be as slight as is compatible with moving the head.*" (Page 226.)

The author recommends a careful study of the mechanism of labour, as preparatory to the proper understanding of delivery with the forceps. The late Prof. Hodge was very careful to teach the connection between natural delivery and that under the forceps, and to show that the instruments were to follow with the head its natural movements. He believed that the blades of the forceps should fit and be applied to the sides of the foetal head, and that they followed all the movements of the same when properly handled. If the forceps are of such a form as to closely fit the head, there is no reason why they should antagonize its movements in skilful hands. Certainly the light and delicate blades of Sawyer¹ could be so applied as to demonstrate the possibility of rotation with, and not within, them. With kite-shaped fenestræ and widely-set blades, the rotation may possibly be interfered with, or occur within them; but this certainly is not the case in many deliveries under the blades of Davis, as variously mounted with long and short handles.

Conjoined Twins. Dr. PLAYFAIR exhibited the Bohemian sisters, which were three years old in January last. They are united posteriorly by their sacra, and are the counterpart of the Hungarian sisters, born in 1701, who lived to be 21 years old² (not 23, as generally stated), and the Carolina sisters, now nearly 30 years old.³ It is remarkable that the only cases of long survival of this order of monstrosity, in a period of 180 years, should have all been females.

On the Induction of Abortion as a Therapeutic Measure, is the subject of a paper by WM. O. PRIESTLEY, M.D. As there can be no question of the occasional necessity of this procedure, it is important to define the conditions which render it justifiable; these, according to the author and the discussion, may be stated as the following:—

1. "Such narrowing or deformity of the female pelvis, clearly ascertainable during the earlier months of pregnancy, as will absolutely preclude the birth of

¹ Sawyer's forceps weigh but five ounces.

² Born Oct. 26, 1701; died Feb. 8, 1723.

³ Born July 11, 1851.

a viable child. The smallest diameter permitting the passage of a living child has been calculated at $2\frac{3}{4}$ inches. If, therefore, the largest diameter present is less than this, either abortion must be induced, or, the patient being allowed to go her full time, must be delivered by craniotomy or embryulsiion, or by Cæsarean section."

2. "When the genital canals are so narrowed by the presence of tumours, cicatrices, or of malignant disease, that the transmissiion of a viable child at a later period is impossible."

3. "In obstinate vomiting depending on pregnancy, when the patient's strength is so reduced that a fatal result is anticipated, if relief cannot be afforded."

4. "In eclampsia or puerperal convulsions during early pregnancy, with or without albuminuria, where the attacks are so frequent and severe as to imperil the life of the patient. In these cases all the resources of art for the treatment of convulsions should first be exhausted, and abortion only be induced as a last resort to save life."

5. "In some instances of irreducible retroversion or flexion of the uterus," where grave symptoms imperil the life of the patient.

6. "In cases of severe and uncontrollable hemorrhage during early pregnancy threatening the life of the patient."

7. "In certain acute and chronic diseases where the complication of pregnancy is undoubtedly endangering the safety of the patient, and where bringing gestation to an end enhances her chances of recovery." As in acute dropsy with albuminuria; hemorrhage from the bowels threatening to end fatally; heart-disease with dangerous dyspnœa; severe chorea; mania depending on pregnancy; nephritic retinitis with albuminuria; etc.

General Rule.—The operation is legitimate only "*when the life of the mother is so imperilled by the continuance of pregnancy that emptying the uterus presents itself as the only alternative to save the patient.*"

In all cases, where possible, a consultation should be held as to the necessity or propriety of operating, in order that there shall be no question as to the legitimacy of the procedure. We have known instances in which this was not done, even by very conscientious men; but the urgency of the cases demanded such immediate action that there was no time to be lost.

R. P. H.

ART. XXXV.—*The Student's Manual of Venereal Disease, being the University Lectures delivered at Charity Hospital, B. I., during the Winter Session of 1879–80.* By F. R. STURGIS, M.D., Clinical Lecturer on Venereal Diseases in the Medical Department of the University of the City of New York, etc. 12mo. pp. 196. New York: G. P. Putnam's Sons, 1880.

In his preface Dr. Sturgis remarks that books are apt to be read in inverse proportion to their length, and that with this fact in view he has eschewed all mooted points in venereal medicine. This will no doubt be considered rather an assumption by the "unicists," when they read on the very first page of the first chapter that gonorrhœa, chancroid, and syphilis are distinct and separate from one another, "having nothing in common with each other, although they may all be present upon the same person at the same time." And further, "of these three diseases, only the last one, syphilis, is constitutional; the other two, gonorrhœa and chancroid, are local. Remember, then, *gonorrhœa and chancroid are local. Syphilis is not; it infects the entire system.*" Nevertheless

this opinion is that which is held by almost every syphilographer of eminence in the world.

Starting with this declaration of belief, the author does not dwell at any considerable length upon theoretical questions, but takes up at once the practical points of the diagnosis and treatment of the simple venereal ulcer (chancroid). Next he discusses syphilis, and finally gonorrhœa.

It is not necessary for us to review the book before us in detail. There are in it some few statements with which we do not entirely agree, but to dissent much would be to place ourselves in opposition not only to the author, but also to the best syphilographers of the present day.

The book is put forth as a manual, not as a treatise, and it is all that it was meant to be. Its brevity and its cheapness are no trifling recommendations, and it would be well if these should cause it to get into many libraries, the owners of which are at present utterly without well-defined and accurate views in regard to a subject of the utmost importance to themselves and their patients. It is altogether too common nowadays for men, otherwise competent, to know almost nothing about the real nature of syphilis. To justify one in speaking with great positiveness about it requires special and extended study; but, while such manuals exist as the one before us, there is no excuse for mistakes such as are still often made.

C. W. D.

ART. XXXVI.—*Experimental Researches on the Temperature of the Head.* By J. S. LOMBARD, M.D., formerly Assistant Professor of Physiology in Harvard University. 8 vo. pp. 100. London: H. K. Lewis, 1881.

In 1879 Dr. Lombard published a work on the "Regional Temperature of the Head," in which the results of sixty thousand observations were recorded. Three distinct essays are bound together in the present volume. The first is on some points relating to the normal temperature of the head; the second is on the effect of voluntary muscular contractions on the temperature of the head; and the third is on the influence of the temperature of the air on the temperature of the head.

Broca, Gray, Maragliana, and Seppilli, and a few others, came to the conclusion, from their observations, that the left side of the head has uniformly a higher temperature than the right. Lombard, however, found in the experiments published in 1879, that every one of the small spaces into which he divided the surface of the head might be hotter on the right side or on the left in turn. The idea suggested itself to him that *the degree of absolute temperature* of the parts examined might have something to do with the presence on the right side at one time, and on the left at another, of superiority of temperature, or again, with the presence at certain times of equality of temperature. The experiments recorded in the first of the three essays were made to test this idea. A part of the head covering the "frontal station" of Broca was selected for examination. This station is somewhat back and above the external angular process of the frontal bone. The absolute temperature of one side was first obtained. The difference of temperature between the two sides was then taken, and this difference, added to or deducted from the absolute temperature first obtained, gave the absolute temperature of the second side. Both the

thermometer and thermo-electric apparatus were used. At least fifteen careful comparisons of the two sides were made at each step of the investigation. Four elaborate tables of results are given, and these are carefully analyzed. The conclusions reached are somewhat contradictory.

"Summing up the results of all our analyses, it would seem that the degree of absolute temperature has no definite influence on the frequency of occurrence of superiority of temperature on either side of the head, but a limited influence, at best, on equality of temperature of the two sides; at every absolute level each of the three conditions may be found with varying frequency at different times."

Lombard compares the two sides of the head to two furnaces of equal range, but the fires of which are, to a certain extent, managed independently of each other, and with a variable degree of regularity, the relative powers of the two being thus uncertain, and either one likely at any moment to surpass the other.

He doubts the reliability of conclusions drawn from examination of the temperature of the head in disease, unless much greater latitude be given to normal variations of temperature, both absolute and relative, than has generally been accorded by those who have given special attention to this subject.

The experiments on the effects of voluntary muscular contraction on the temperature of the head, were the joint work of Dr. Lombard and Frederic H. Haynes, M.D., physician to the Warneford Hospital, Leamington. In April, 1880, Dr. R. W. Amidon, of New York, published in the *Archives of Medicine* a series of experiments entitled, "The effect of Willed Muscular Movements on the Temperature of the Head: New Study of Cerebral Cortical Localization." This paper was the prize essay of the Alumni Association of the College of Physicians and Surgeons of New York, March 12th, 1880. Amidon sought to prove that willed muscular movements caused elevation of temperature at the surface of the head, sufficiently marked to be capable of detection with thermometers. He also took the ground that exercise of certain muscles, or groups of muscles, affected the temperature of definite and limited areas of the integument of the head. Each muscle, according to him, had a special thermal centre in the cortical substance of the brain, the temperature of which centre was increased when the muscle acted sufficiently. This increase, he held, could be detected in a circumscribed area of the overlying integument by means of instruments of no great delicacy.

"Thus contraction of the quadriceps extensor cruris of one side caused an average rise of 0.409° C., on the opposite side of the head, in a space commencing 300 mm. behind the root of the nose, and extending backwards, on the median line, 80 mm., and laterally from the same line, 50 mm., the extremes of the rise of temperature being 1.388° C.; while contraction of the orbicularis palpebrarum of one side produced a rise averaging 0.342° C. (the extremes were 0.833° C., and 0.1388° C.) on the opposite side of the head, in a space situated about 100 mm. above, and a little to the rear of the external auditory meatus, and having a diameter of about 18 mm."

Dr. Amidon used Gray's modification of Seguin's surface thermometer. He mapped out some twenty-five districts on the surface of the head, as thermal centres or areas of a corresponding number of muscles or groups of muscles. He also drew attention to the correspondence between these external areas and Ferrier's psycho-motor centres of the cortex. We might also say, in passing, that he located psycho-motor centres in the frontal lobes, additional to those indicated by Ferrier.

As early as 1866-67, Lombard, while experimenting with thermo-elec-

tric apparatus on the influence of different mental states in the human temperature, was led to try the effect of muscular contraction in the temperature of the head. The muscular effect was made use of simply as a means of fixing the attention. In a few instances slight rises of temperature were noted.

In the investigations made by Drs. Lombard and Haynes, all the essential experimental details laid down by Dr. Amidon were carefully observed. Thermo-electric apparatus was, however, substituted for thermometers. The particulars of an elaborate series of experiments are given. These were as follows: (1) Thirty-two experiments on the contraction (simultaneously) of the extensor muscles of the leg and of the toes (quadriceps extensor cruris; and the extensors proper of the toes), and of the flexors of the tarsus upon the leg (tibialis anticus, and peroneus tertius). (2) Four experiments on the contraction of the muscles of the calf. (3) Sixteen experiments on the contraction of the biceps of the arm. (4) Ten experiments on the contraction of the trapezius and the levator anguli scapulæ. (5) Ten experiments on the contraction of the orbicularis palpebrarum. (6) Nine experiments on the contraction of the orbicularis palpebrarum, levator labii superioris proprius, zygomatici, and risorius, all acting simultaneously. In each of these series of experiments the pile was placed at selected points on the side of the head opposite to the side of the body on which the muscles were made to contract. The points selected were those used by Dr. Amidon also, and supposed by him to correspond to psycho-motor cortical areas.

The results of the experiments of Drs. Lombard and Haynes were most decidedly contradictory of the views held by Dr. Amidon. According to the latter, rise of temperature was as a rule the result of the willed muscular movements. Of the eighty-one results arrived at by Drs. Lombard and Haynes, only three, or less than four per cent., could be construed as affording evidence of a rise of temperature due to muscular contraction *per se*. The evidence seemed to be greatly in favour of the view that the muscular movements brought about a *fall* of temperature. The cases in which a fall of temperature was the ruling condition were more than five times as numerous as those in which a rise of temperature prevailed. MM. Bert and Franck have also repeated Dr. Amidon's experiments and have failed to confirm his results.

Drs. Lombard and Haynes conclude as follows:—

“But although there is not sufficient proof of a rise of temperature in the head specially due to muscular contraction (leaving out the question of exact localization of such a rise), yet it would seem, that, in a certain number of cases, the muscular movements, *in some way, cause a disturbance of the temperature of the head*, this disturbance showing itself in elevations or depressions, or again, in irregular fluctuations of temperature. In fact, the variations of temperature noted in a number of the experiments were greater than those ordinarily met with in the quiescent natural state; but in exactly what way these variations are connected with the muscular movements is not yet clear.”

The experiments which form the basis of the third essay before us were made with a view of obtaining a general idea of the extent to which the temperature of the surface of the head is affected by the temperature of the surrounding air. This question has, of course, an important bearing upon practical cerebral thermometry. The results of the experiments are presented in a series of elaborate tables. The following are the averages of four of these tables:—

		Average temp. of air.	Average temp. of head.
Table 1	. . . . .	18.9420° C.	35.7945° C.
" 2	. . . . .	13.6708° C.	35.0776° C.
" 3	. . . . .	9.6938° C.	34.8098° C.
" 4	. . . . .	7.0147° C.	34.1939° C.

"From the above values there appears to be a general relation between the average temperature of the air and of the head in the several tables compared with each other. Thus as the average temperature of the air falls, in the list, the average temperature of the head likewise declines; but the fall in the head is but slight compared with that occurring in the air, the maximum of the former being only 1.6° C., while the latter at its greatest, is 11.9° C."

Dr. Lombard believes that the *seasons* undoubtedly have an effect on the results of experiments such as he performed, apart from the simple absolute temperatures concerned.

Whatever may be the fate of cerebral thermometry as a means of diagnosis, such praiseworthy labours as those of Dr. Lombard must be most relied upon in determining its scientific position. C. K. M.

ART. XXXVII.—*The Relations of the Abdominal and Pelvic Organs in the Female, illustrated by a full-sized chromolithograph of the Section of a Cadaver frozen in the Genu-pectoral position, and by a series of wood-cuts.* By Professor ALEXANDER RUSSELL SIMPSON and Dr. DAVID BERRY HART. Folio, pp. 11. Edinburgh: W. and A. K. Johnston, 1881.

THE process of making "frozen sections" is well described here, and as it has but rarely been practised in this country it may be well to allude to it. In this special case in order to prevent the displacement of the viscera by the pressure of the freezing mixture the cadaver was inclosed in a galvanized zinc case, surrounded by a large wooden box. The box had holes in it for the escape of the water, and the ice and salt were frequently stirred up. The body was kept in this for a week—a longer time than usual—but necessary on account of the unusual posture. The zinc case being then removed, a broad, salmon-bellied, two-handled saw, with moderately sized teeth, was used to saw it in the median line, water from the melting mixture being occasionally thrown over it. Each half was then replaced in its half of the zinc case and the freezing mixture in order to make accurate, full-sized tracings. This was done by thin, transparent plates of gelatine. The drawing was then transferred to paper, coloured, and lithographed. For permanent preservation the sections are to be sawn in slabs two to four inches in thickness; placed, while still frozen, in suitable block-tin or glass trays, surrounded by plaster of Paris to prevent displacement on freezing, and preserved by weak spirit.

The author does not believe that the distension of the vagina by air in the genu-pectoral posture alone will replace the retroverted uterus, but advises that the volsella be used to draw the uterus down towards the perineum, and that the cervix be then carried towards the sacrum, when the fundus by its weight will swing forwards; or, that rectal distension be used; or, that direct pressure on the fundus be employed. It can scarcely, however, be denied that the postural treatment not only aids greatly in the reposition, but that clinically it is an efficient and practical

means of accomplishing that result. Moreover, his plate would seem to show that gravity without the volsella or other means certainly would do nearly all that Campbell and others have claimed.

To the anatomist the plate affords an excellent means of study of the relations of parts of great interest; and the bibliography appended is a commendable feature which every writer of a monograph should imitate.

W. W. K.

ART. XXXVIII.—*The Structural Anatomy of the Female Pelvic Floor.*

By DAVID BERRY HART, M.D., F.R.C.P.E., Assistant to the Professor of Midwifery in the University of Edinburgh, etc. 4to. pp. 42, with 26 Figures and 2 Plates. Edinburgh: Maclachlan & Stewart, 1880.

ALTHOUGH in time the publication of this book antedated Prof. Simpson's, yet as the work of his pupil and assistant, and as correlated to his own, it may properly follow it. Nor need the teacher be ashamed of the pupil. If this be a sample of what he may do in the future, there is much good stuff in him. It is a graduation thesis which well deserved the gold medal and the Syme Fellowship which it won.

The author studies, first, the closed female pelvic floor in vertical mesial section (or, we much prefer to say, "sagittal," since "vertical" is indefinite), and coronal mesial section; secondly, the pelvic floor opened up naturally by labour and by the genu-pectoral posture; thirdly, its pathological displacements in prolapsus uteri (or, as he calls it, "sacro-pubic hernia"), and in instrumental hauling down of the uterus, and then the bimanual exploration of the pelvis, the artificial opening of the pelvic floor by specula, and, finally, its artificial support by pessaries.

His Anatomy has relation not only to structure but also to function. He differentiates the pelvic floor into a "pubic" and a "sacral segment." The line of division is the axis of the vagina. The pubic segment is loose in texture since the bladder and post-pubic fat are its chief constituents, and loose in its bony attachments, and can be displaced upwards as in labour, or downwards as in prolapsus uteri and in the genu-pectoral posture; while the sacral segment is firm in its texture, for it is made up chiefly of the perineum and the firmly closed anus and its sphincter, can be driven down as in labour, but remains in position in prolapsus (except the posterior vaginal wall), and also in the genu-pectoral posture. Three "lines of cleavage," he also draws attention to, viz., the vaginal, rectal, and recto-vaginal, *i. e.*, midway between the two. The first divides the pelvic floor into its two segments as above, and is the physiological line of cleavage; the second limits the displacements in the bimanual examination, and is the instrumental line of cleavage; the third differentiates the displacements in prolapsus, and is the pathological line of cleavage, names which, while we may take exception to them (especially the "instrumental"), yet we must see their value in the specific applications thus made.

In one thing we are glad to see he is no uncertain watchman. The uterus is not suspended by the ligaments to any valuable extent, nor supported by the vaginal walls alone, but "rests on the compact unbroken pelvic floor." His plates, presumably made from frozen sections, though he does not say so, thoroughly sustain the idea, and the results of lacerations of the perineum corroborate it.

W. W. K.

ART. XXXIX.—*La Syphilis: son Histoire et son Traitement.* Par le Dr. JAMES TARTENSON.

Syphilis: its History and Treatment. By Dr. JAMES TARTENSON. Second edition. 8vo. pp. 238. Paris: J. B. Baillière et Fils, 1880.

THE author of this work announces himself at the very beginning as an anti-mercurialist, and asks why all do not reject a remedy which is recognized to be dangerous and have recourse to a plan of medication which offers an incontestable superiority—that is the “*tonic*” method? The answer he finds is that the force of authority and the influence of the temporary effect of mercury upon secondary eruptions are, to many practitioners, irresistible. Relapses, however, so constantly follow mercurial treatment that he considers the roborant or tonic method far better, which he claims effects cures in periods varying from six months to a year, and is not followed by relapses.

With this declaration of principles he proceeds to consider his subject systematically. Taking up first the origin and history of syphilis, he dismisses the notion that it originated in America, and was transplanted thence to Europe, asserting that there are records of its existence 1700 years before the Christian era. In support of this he refers to a book by Captain Gardy,¹ published in 1863, entitled “*La Médecine chez les Chinois.*” He gives also an interesting tradition of the seduction of the wives of certain worshippers by the Hindoo god Siva, for which he was punished by a fire falling upon his genitals and separating them from his body. This tradition asserts that Siva, enraged by his sufferings, transmitted his affliction as a disease to mankind. Tartenson thinks the Jews became the victims of syphilis from cohabiting with the Moabitish women, and Job and King David to have referred to this disease in their laments. He follows the history of syphilis down through the times of the Greeks and Romans, and claims that the researches of Abbé Brasseur de Bourbourg prove beyond a doubt, from original documents in the language of the inhabitants of the valley of Anahuac, that syphilis existed here long before Columbus crossed the Atlantic. This statement gives some confirmation to the claims of Professor Jones that he has found syphilitic lesions of the bones dug up from ancient burial mounds in certain Southern States.

Some of the evidence cited in the book before us is vague; some is preposterous—that about the Jews, and Job, and David, for example—and some not to be hastily rejected. The truth is, the means for deciding upon the existence or non-existence of syphilis before the year 1494 are not yet sufficient to warrant great positiveness on either side of the question.

What happened at the end of the fifteenth and the beginning of the sixteenth centuries, the author narrates graphically, attributing the great outbreak to other diseases in addition to syphilis, with which, in the general alarm, they were confounded. Under the head of subsequent epidemics, he cites several that are probably incorrectly named. Certain it now seems that the radzyge, of Sweden and Norway, and the yaws, of Africa, are not syphilis.

In speaking of the geographical distribution of the disease, we have figures that would be alarming to the last degree, if we did not know the general unreliability of almost all statistics, and the special unreliability

¹ Called Capt. Dabry, in some books on Venereal Diseases.

of statistics made up from reports of army medical officers and boards of health, digested and analyzed by one who looks upon the simple venereal ulcer—the chancroid—as syphilitic. The world is not in danger of being depopulated by syphilis, as one would suppose from hearing persons like the author talk. On the contrary, syphilis is dying out, and the span of life is constantly growing longer.

When speaking of syphilis in France, Dr. Tartenson shows his attitude toward the so-called regulation of prostitution, in saying: "Although prostitution is strictly regulated in France, syphilis is very common there, which is one of the best arguments in favour of the partisans of a complete reform of the regulation, which is as opposed to the principles of public morals, and of the respect for individual liberty, as it is useless, regarded from the point of view of its sanitary results." Syphilis, the author tells us, is found everywhere, except in Iceland, the Faroe Islands, and the centre of Africa, where no case is seen except occasionally an imported one. The inhabitants of the northern countries of the continent of Europe suffer with very severe forms of the disease, which may be due to their habit of rarely changing their clothes or washing their bodies.

The chapter on the nomenclature of syphilis is very curious and entertaining, giving a variety of names that are not to be found in any other single book.

The chapter on the nature of syphilis differs little from what one finds in every book on this subject. A sensible distinction is made between contagiousness and inoculability, the initial lesion is ably described—though, we think, with too strong an implication that it is always more or less ulcerated—and it is stated that occasionally the initial lesion may be a squamous or mucous patch, and not a chancre. The period of incubation is correctly defined, and no intimation—in this place—conveyed that, until remote signs appear, the disease is local.

Entering upon the question of unicism and dualism, the author claims that hard facts support the former of these theories, that inoculation from a chancroid may produce syphilis and that from a chancre produce none, but only a chancroid. It is incomprehensible to us how the advocates of unicism—of whom there are few enough, nowadays—insist upon classifying chancres and chancroids according to their physical appearances alone, and fail to see the conclusive force of the fact that there never was an initial lesion of syphilis, whatever its appearance, that was not derived from an individual who then or afterward showed general symptoms of this disease; and, conversely, that never has anything but a local lesion been derived from an individual, who did not then or afterward have remote manifestations. On page 71, the author says Auzias-Turenne has seen induration develop after several successive inoculations, made with the pus of a simple chancre (chancroid), in the arm of one of his subjects. He then cites seven conclusions of Melchior Robert, all of which are purely negative, except the one just referred to, which he includes. This, as will be seen, shows no evidence whatever of a syphilitic infection from inoculation with non-syphilitic virus: a local induration, which might be occasioned by any irritating matter, being the only symptom noted. The other conclusions only indicate, what every one knows, that a lancet may be charged from a lesion on a syphilitic and fail to inaugurate syphilis. The same is true, thousands of times, of inoculations from the pustule of vaccinia.

We may not follow these questions further. The author's arguments

are ingenious, though we think them fallacious; his conclusion is that the initial lesion of syphilis (chancre), and the simple venereal ulcer (chancreoid), are caused by the same poison—to which we are diametrically opposed.

In regard to prognosis, Tartenson agrees with almost all modern syphilographers in stating that syphilis is a very curable disease. The use of mercury he thinks retards recovery, tending to suppress secondary manifestations, but to promote tertiary lesions.

Hereditary syphilis receives due attention, after which the matter of treatment is taken up. We may not dwell upon the full history given, and the argument against every other method than that which the author advocates, namely, the tonic or "*reconstituante*," as he calls it. By this he asserts that he has radically cured, in from three to six months, 240 out of 246 cases that he treated from the beginning. The majority of these he has had under observation for at least eight years. The six cases not cured in so short a time were cured in about three years. In 183 cases, first seen after secondary symptoms had appeared, the results were analogous to the first set, but required from eight to twelve months. Of 640 patients who had previously taken mercury, about 150 were cured after two or three years of tonic treatment. The rest showed, from time to time, evidence of persistence of the diathesis.

Owing to the fact that Tartenson is a dualist, we must suppose that a large proportion of his cases were not what we would call syphilis. Yet it is to be noted that he observed in many of the first class of cases—those treated purely by the tonic method—erythema, or a papular syphilide, but nothing afterward. Cervical lymphangitis was present in almost all cases, mucous patches were rare, and in the majority of cases there was no falling of the hair.

The "*traitement reconstituant*" comprises careful hygiene, nourishing food, abstinence from strong coffee, tea, and alcoholic liquors, moderate exercise in the air, avoidance of fatigue, early retiring and rising, frequent baths, very warm garments to provoke sweating, and continence. The medication consists of drugs that resist the disintegration of the blood corpuscles: potassio-tartrate of iron, the black oxide, the sub-carbonate, the iodide, reduced iron, and cinchona. The chancre is to be cauterized with the hot iron—preferably with the thermo-cautery—and dressed with water and aromatic wine, or the latter alone; no ointments should be applied. If a bubo suppurates, it should not be freely opened, but a fine seton should be passed through it—a plan which has worked well in our own hands. For the wandering pains of early syphilis the author recommends opium, chloral, and chloroform; for gummy tumours the iodide of potassium; and the same for osteocopic pains.

The author quotes, with endorsement, Ricord's opinion that the chancre is at first but a local lesion, and that if it can be early destroyed, the syphilis is "killed in the germ." He has himself tried cauterization but finds it disappointing; excision he thinks impracticable. He recommends, however, electrolysis; trusting to its chemical action to so alter the poison as to render it ineffective. How much weight is to be attached to his experiments may be judged from his statement that he was successful in some cases in which *no induration had appeared*; and that, before treating the chancre, he inoculated the patient from it, *with negative results*. This strikes us as an example of the customary logic of the dualists.

The concluding chapter is on prophylaxis, and contains some excellent

suggestions. The portion devoted to personal preventive measures is very curious, regarded from an American standpoint. Of the "condom," he says : "*C'est, suivant la définition d'une femme d'esprit bien connue : une cuirasse contre le plaisir et une toile d'araignée contre le danger.*"

In conclusion we would state that we regard this book as one of great merit. It exhibits a thorough acquaintance with the French literature of syphilis, and no inconsiderable knowledge of English views in regard to it; while on the other hand, there is scarcely a reference to any German author—we cannot now recall one. We have noted as we went along our dissent from the author's opinion that the simple venereal ulcer is syphilis, and, with this exception, we have no hesitation in strongly recommending his work to all syphilographers.

C. W. D.

ART. XL.—*Grundzüge der Physiologie des Menschen mit Rücksicht auf die Gesundheitspflege.* VON JOHANNES RANKE, Dr. Med. und Professoran der Universität zu München. Vierte umgearbeitete Auflage. 8vo. ss. xxv. 1065. Leipzig : Wilhelm Engelmann, 1881.

THIS thorough work on Physiology, which the author modestly terms "Outlines of Human Physiology," supplies in a great measure a want which has been too often used as a reproach to modern physiology. It attempts, and with a very decided degree of success, to apply the immense number of facts of the most advanced physiology to the needs of the practising physician.

Physiology now covers such vast fields of research that it is gradually becoming more and more separated from the art of medicine and growing into an abstract science cultivated for its own sake. This divorce of physiology from practical medicine, which cannot be too much regretted, is, we think, to be explained on two grounds: In the first place, our most eminent physiologists are not physicians, and in many instances have not even a medical degree; they, therefore, study the science as entirely apart from the art which should rest upon it, leaving to others the application of their results to practical ends. On the other hand, physiology has fallen into an undeserved discredit, from the attempt of practical men to apply its facts without any sufficient knowledge of their bearing.

As an instance of this, it is only necessary to mention the old controversy as to the action of mercury on the liver. Physiological experiment has proved over and over again that mercury exercises no influence in increasing the secretion of the liver. Experience has, on the other hand, clearly enough defined a condition of intestinal disturbance which is relieved by the traditional blue pill and salts. Here we have two facts, the one physiological, the other empirical, and resting on these facts two theories: the one, a so-called physiological theory, that mercurial remedies are useless; the other, that mercury is beneficial by increasing the secretion of bile. Both are demonstrably false, yet this is an instance which is often given of the injury done by physiological theory to practical medicine, while it is simply an example of the conclusions drawn by practical men, and not physiologists, from physiological facts.

In the author of the book under consideration we have a physician, and at the same time an eminent physiologist, and there is not a section in his book which does not show his entire familiarity with both sides of

his subject, and his ability to draw reliable practical conclusions from physiological data.

The book is written with the sole object of supplying the physician and medical student with a reliable text-book, and we know of no work which fulfils its mission better. The book is divided into three parts. In the first under the heading of General Physiology is described the physiology, chemistry, and physics of the animal cell, including the origin and development of tissues (embryology). The first section of Special Physiology is occupied with the study of nutritive changes, the subject of food being first discussed in a most exhaustive manner, and as thoroughly as could be expected in a monograph on the subject. The remainder of the section deals with the laws of nutrition, with which are included some interesting experiments on the nutritive value of different diets, the digestive changes in the food, and the mechanics of digestion and absorption. The second section of this part deals with the blood and its circulation, and the third with secretion, under which respiration is considered. Under the next division concerning the Liberation of Energy are considered the subjects of animal heat, the movements of the skeleton, voice and speech, and the mechanics and chemistry of muscle. Animal electricity and the special senses are next dealt with, and then the central nervous system and generation.

The work contains a copious index and table of contents. One feature of the latter is the collection of more than two pages of indices of all the paragraphs relating to practical hygiene, such as the effects of atmosphere and climate on health, the relations between what Darwin would term the *environment* and health, etc., and a similar index to the description of the most important physiological and chemical manipulations described in the text.

R. M. S.

ART. XLI.—*Lectures on Diseases of Bones and Joints.* By C. MACNAMARA, F.R.C.S. Eng., Surgeon and Lecturer on Surgery at the Westminster Hospital, etc. Second edition. 12mo. pp. 551. London: J. & A. Churchill, 1881.

THIS work, which was reviewed in this Journal two years ago, has been partially re-written, and is increased in size by the addition of chapters, or lectures as they are called, on the diseases of special joints. Hence little need be said at the present time, except to reiterate the statement that there is much of practical interest in the volume, though at times the continuity of the text is broken by the insertion of clinical histories that add little to the merit of the author's work. The consideration of joint affections is thorough, and shows that the writer has drawn inspiration from his own hospital experience. The division of synovitis into serous, *muco-purulent*, and purulent is scarcely, however, in accordance with the usually received nomenclature. He treats many of these cases by applying extract of belladonna ointment and encircling the joint with cotton, over which he applies an elastic bandage. In some instances a splint is then adjusted to prevent motion. Suppurative synovitis is managed by free incision and drainage, which is now fully recognized by all practical workers as the proper method of treating such serious conditions. It seems proper to criticize his definition of chronic

osteo-arthritis, or rheumatic gout; which he styles a hybrid in which gout and rheumatism are combined (p. 386). The term rheumatoid arthritis, so generally used, is a good name for the disease, which has little pathological relation to either gout or rheumatism, except in location. In coxalgia he often favours myotomy, and in long-standing cases at times drills into the joint through the trochanter and neck of the femur for evacuation of the synovial contents. In pulpy degeneration of joints, he states (p. 380) that not a few cases may be cured with ankylosis by destroying the diseased tissue by incision and chloride of zinc. This is better than amputation. At the end of the book proper he has inserted two appendices, giving histories of a case of epiphysitis and septicæmia, and a case of wound of the perineum followed by septicæmia. These histories, though interesting in themselves, are out of place, and would be better placed in some current medical journal.

J. B. R.

ART. XLII.—*A Treatise on the Materia Medica and Therapeutics of the Skin.* By HENRY G. PIFFARD, A.M., M.D., Professor of Dermatology, Medical Department of the University of the City of New York, etc. 8vo. pp. 351. New York: William Wood & Co.

THIS volume forms one of the series for the current year of *Wood's Library of Standard Medical Authors*. It is divided into two parts as indicated by the title. Under the head of materia medica, an alphabetical catalogue is given of those drugs which are stated by authors to exert a direct or indirect effect upon the skin. By an ingenious system of references the reader may ascertain the officinal name of the drug, its origin, and its effects upon the healthy skin following ingestion and local application; the cutaneous affections in which the drug has been found curative or useful when administered internally, and those in which it has proved useful when locally applied; also the authorities for the statements made.

The second part is essentially a treatise on skin diseases with the treatment strongly accentuated, and the other points lightly touched upon. In addition to the treatment by drugs this section also includes reference to electricity, and to the various mechanical methods, scarification, puncture, scraping, etc., commonly employed in the treatment of skin diseases.

Dr. Piffard's well-known therapeutic versatility and ingenuity have never been more favourably displayed than in the volume before us. It is rich, not only in the knowledge accumulated by others, but in that which is the fruit of the author's personal experience, and is likely to be highly valued by the specialist who is best able to perceive and appreciate its true worth. That its value will be equally great to the general practitioner we are inclined to doubt: not because all that he needs is not to be found in the book, it is equally to be found on the apothecary's shelves, but because he has not the requisite skill to use the weapons provided for him. As yet the knowledge of the dermatologist is far in advance of his brother practitioners in his chosen specialty. But in the nature of things the specialist must in time accomplish his own extinction. When his pioneer-efforts shall have made the road easy and plain, and shall have cleared away the rubbish accumulated by the "all-around man" of the last age,

then his successors shall take possession of a well-ordered domain of knowledge, easily comprehensible, and to be mastered as part of an ordinary medical education.

To this end such books as that of Dr. Piffard certainly, though indirectly, tend. It is valuable because it collects into methodical arrangement the numerous facts hitherto scattered through a multitude of not easily accessible books and journals. But let the uninstructed in dermatology beware of pitfalls. Not every drug warranted as "good for" a given disease will be found to cure it in practice, and many are the *ignes fatui* scattered through the pages before us. Our advice to the reader is to read it with care, and to select and make use of all that he can assimilate.

Iss nur was du verdauen kannst,
Dass ist das Räthsel deines Lebens.

A. V. H.

ART. XLIII.—*A Manual of Diseases of the Eye and Ear, for the Use of Students and Practitioners.* By W. F. MITTERDORF, M.D., Surgeon to the New York Eye and Ear Infirmary; Ophthalmic Surgeon to Bellevue Hospital, Out-patients' Department. 8vo. pp. 445. New York: G. P. Putnam's Sons, 1881.

A FEW years back little or nothing was done for the enlightenment of the general practitioner on the subjects of the diseases of the eye and ear, but, at the present rate of production, he is likely before many more years have passed to find his chief difficulty, particularly as regards the eye, in an *embarras des richesses*. The present treatise, among other advantages, offers that of including both subjects in one volume. Barring some evidences of haste, the author has done his work well. The anatomical descriptions are clear and sufficiently full, the descriptions of pathological conditions are excellent, and the directions for treatment are practical and sound. The book will be found a safe and valuable guide, and the practitioner who knows all that it contains will not often find himself at a loss in the care of this class of affections.

In the selection and arrangement of his matter, the author has been very fortunate, but his manner of presenting it is not always unexceptionable. There is an unusual number of grammatical oversights and ambiguous sentences, which will no doubt be corrected in the leisurely revision of a second edition. Other inaccuracies are rare and generally unimportant. On page 318 the explanation of the visual angle is quite unintelligible, and the loose statement is made that an angle of at least 5° is required for distinct vision. Snellen's test-types are constructed on a basis of 1° , which is the size of the limbs of the letters at their specified distances, the height of the letters being five times the width of their limbs.

The ophthalmic division of the book is illustrated by a number of admirably executed coloured plates from Sichel and Liebreich. The latter would be more valuable if they were accompanied by descriptions. Several of them are even entirely ignored in the text; while the plates from Politzer, which the preface assures us "will be found of great service in the study of the diseased conditions of the drum-head," are, in point of fact, not found at all.

The mechanical execution of the work is excellent, and the book presents an unusually attractive appearance.

G. C. H.

ART. XLIV.—1. *A Pocket Atlas of the Descriptive Anatomy of the Human Body.* By J. N. MASSE, M.D., Professor of Anatomy, Paris. Translated from the last Paris edition, and edited by GRANVILLE SHARP PATTISON, M.D., Professor of Anatomy in the University of New York, etc. 8vo. pp. xxii. and Pl. 112, with Explanatory Text. New York : Harper & Bros., 1845.

2. *Anatomical Plates arranged as a Companion Volume for "The Essentials of Anatomy"* (by WILLIAM DARLING and A. L. RANNEY), and for all works upon Descriptive Anatomy, comprising four hundred and thirty-nine designs on steel by Prof. J. N. MASSE, of Paris, and numerous diagrammatic cuts selected or designed by the Editor, together with Explanatory letter-press, edited by AMBROSE L. RANNEY, A.M., M.D., Adjunct Professor of Anatomy in the Med. Dept. of the University of the City of New York, etc. 4to. pp. xvi. and Pl. 124. New York : G. P. Putnam's Sons, 1881.

WE have given the above title-pages very nearly in full in order that our readers may compare them, and the claims put forth in them by the respective editors. Both are professedly American editions of Masse's well-known "*Petit Atlas d'Anatomie*," first published in 1843, with a second edition in 1844, which Professor Pattison did actually "translate" and "edit" in 1845. It may be worth our while to examine and compare the two in some detail.

So far as the title-page is concerned, Dr. Ranney's differs from Dr. Pattison's only in two particulars, viz., that Professor Masse is pushed into the background and Professor Ranney into the foreground, and that the latter has added "numerous diagrammatic cuts." These last consist of twelve plates (the title of one of which, Plate No. 100, is omitted from the list of plates) with cuts selected mostly from Wilson, Séguin, and others. The few he has designed add but little to the value of the book, and in at least one instance the cut is precisely wrong. In Pl. 117, fig. 1, representing the optic chiasm, each optic tract is made to supply the retina from the entrance of the optic nerve, right and left, *i. e.*, in the right retina the left optic tract, for instance, will supply more, and in the left it will supply less than one-half of the retina. The fact, however, is that each optic tract supplies mathematically the corresponding half of each retina, the line of division passing not through the optic nerve, but through the macula lutea.

But it is when we compare what Dr. Ranney has *not* supplied that our astonishment is most excited. The fact, in plain English, is simply this : Dr. Ranney has taken the stereotype plates of Dr. Pattison's edition of Masse and has reproduced from them text, plates, editor's preface, author's preface, notes, everything as his own, without the slightest allusion to Dr. Pattison in any way. Let us see the proof. We say he has taken the same stereotype plates, because they correspond in size, and the text is the same, line by line, and word by word with a few and utterly insignificant stars and foot-notes. Where, in Dr. Pattison's edition, there is a change of type to fit the page, Dr. Ranney's shows the same change ; nay, even more, where, in the one, there is a broken letter, or one of a wrong font, it is reproduced in the other.

The "editor's preface" of the later edition reproduces that of the former, almost without change. In the Harper's edition it is called a "Pocket

Atlas." In Putnam's the "Pocket" is omitted, for the book is doubled in size, and there is no allusion to any colouring of the plates, since there is no coloured edition as there was of Harper's. Each editor "has felt the want of such a work to recommend to his pupils;" the large size of most atlases, "in the opinion of the editor" of each book, "is a great objection against their use." Both editors thought they "could improve the original text of Masse by re-writing the descriptions of the plates," and both alike gave it up after trying it. Both "consider the execution of this work as a proud trophy to the arts of the United States." Each editor admires the liberality of his respective publisher, and has "no doubt it will be met with corresponding support and patronage." And we have no doubt that each has an opinion on the propriety of publishing over again another man's book as his own, although we do not find it recorded in either preface—possibly because their opinions on this subject, strange to say, may not be identical.

The "introduction" ("preface" in the Harper's edition) is the same, *verbatim et literatim et punctuatim*, with neither addition nor subtraction.

The plates have been needlessly re-arranged, and not only needlessly, but badly. Thus Dr. Pattison's edition presents us with the separate cranial bones in the first three plates, and the fourth is the "cranium in general." Dr. Ranney interpolates this plate as number two between the "frontal and parietal," and the remaining cranial bones. Moreover, in Dr. Pattison's edition plates 39 to 42 are really plates on aponeurology, whereas, in Dr. Ranney's, they are so transposed that, while the heading to each plate is correct, the table of contents gives the Fasciæ of the Abdomen under "Myology," the Fasciæ of the Extremities under "Splanchnology," and the Deep Muscles of the Leg and Foot under "Aponeurology."

Perhaps the most glaring blunder is to be found in Dr. Ranney's plate 41. When one is intent on editing another Editor's book after the fashion of this present work, it is judicious to edit the other man out before editing one's self in; not to do so is a piece of forgetfulness which is sometimes strikingly unwise. In a foot-note to plate 38 of Dr. Pattison's book, speaking of the "Adductor Pollicis Pedis," he says: "This is called by Cruveilhier the Abductor Pollicis, but, for the reasons stated in the note which may be referred to in the *Editor's Edition of Cruveilhier's Anatomy*, p. 288, we give it the name which," etc. The foot-note to plate 41, in Dr. Ranney's edition, also refers to the *Editor's Edition of Cruveilhier's Anatomy*. Now, in 1844, Dr. Pattison did edit Cruveilhier's *Anatomy*, and the Harpers published it; but this is the first intimation that Dr. Ranney's editorial labours, like his editorial opinions, are so completely identified with those of Dr. Pattison.

While writing this notice we have received a printed circular from Messrs. G. P. Putnam's Sons, stating that, "through a clerical error, the name of the late Prof. Granville Sharp Pattison, as Translator and Editor of the edition of Masse's *Anatomical Plates*, issued in 1845, has been omitted from the title-page of their present edition. They would also explain that Prof. Ranney's labour, as Editor, embraced such alterations of the *Plates and Text* as was required to bring these fully up to date, together with the preparation of important new material in the way of diagrams and descriptive text." A most remarkable "clerical error" this, to escape the eyes of the publisher, the editor, the proof-reader, and the type-setter!—especially when the old stereotype plates were before them. Perhaps, too, it was a "clerical error" which changed the date of the editor's preface from "Univer-

sity of New York, Oct. 20, 1845," to "156 Madison Ave., Feb. 15, 1881." Perhaps, too, it was a "clerical error" which makes Dr. Ranney, in the two paragraphs that he in fact does add to the editor's preface, refer three times to "the Editor," meaning really himself, but in no wise distinguishing such references from those to "the Editor" in the other paragraphs, meaning Dr. Pattison. As to "alteration of the Plates," we have not found any, and the text, as we have pointed out, has not been altered enough. Such an explanatory circular, under these circumstances, becomes self-convicting.

W. W. K.

ART. XLV.—*How to Use the Forceps, with an Introductory Account of the Female Pelvis and the Mechanism of Delivery.* By HENRY G. LANDIS, A.M., M.D., Professor of Obstetrics and Diseases of Women and Children in Starling Medical College. 12mo. pp. 168. New York: E. B. Treat, 1880.

THE work under review is divided into two parts of about equal length; the first, preparatory to the second, on the mechanism of labour; and the second, on the forceps. The author regards the instrument as an assistant to nature's process, and as such, to be used so as to correspond to the normal method of delivery; to succeed in which, it is important to understand fully the true mechanism of labour as exhibited in natural deliveries of the head. Dr. Landis regards the pelvis in the somewhat novel light of a double conduit, ending in a single exit, and exhibits his views by diagrams, showing the superior strait to be virtually divided into a double entrance, each door of which has an oval form, and is adapted to the admission of the fœtal head, when both are in proper proportion, and the head enters in a correct position. This cordiform character of the superior strait, divisible into two convergent and intercommunicating ovals, permits of a considerable unilateral and postero-lateral deformity of the said strait, without necessarily impeding labour to any marked degree, as there will still remain an oblique oval through which the fœtal head may pass. In such a pelvis, the body of the fœtus, which enters by the other oblique oval, may be impeded for want of space for the passage of the shoulders, which will be forced to rotate to obtain it.

Dr. Landis, having been educated in this city, follows the views of its professors in recommending the use of the Davis forceps, and its modifications, having oval fenestræ, and applying the same to the sides of the child's head. He opposes the oscillatory method of traction, and recommends that the line of force should be made to follow that which the head passes through, when its exit is accomplished by the *vis a tergo*. The student should understand fully the mechanism of labour, and he will then be prepared to aid nature, and avoid any antagonistic movements with his forceps.

The work is well worth a careful perusal on the part of the profession.

R. P. H.

ART. XLVI.—*A Practical Treatise on Diseases of the Skin.* By LOUIS A. DUHRING, M.D., Professor of Diseases of the Skin in the Hospital of the University of Pennsylvania, etc. Second edition, revised and enlarged. 8vo. pp. 644. Philadelphia: J. B. Lippincott & Co., 1881.

THE revised and enlarged second edition of this work, whose previous issue greatly commended itself to the profession, appears with emendations and additions which largely enhance its practical value. The too-prevalent fashion of preparing second editions of a work for the press, has here evidently found no favour. Those who have had reason to know the conscientious and scrupulous care with which the author has devoted himself to the other labour he has set before him, will be prepared to find in these pages a further proof of the excellent quality of his work.

Respecting the more frequently occurring diseases of the skin, the special excellence of this volume has long been recognized, in the accuracy of its definitions, in the simplicity and fidelity of its clinical histories, in the absence of untenable theories and of an intolerably redundant nomenclature, and in the value of the therapeutic measures recommended both with a view to general and topical treatment. Naturally, in none of these particulars does the new edition fall short of the excellence of its predecessor. We look over its leaves and find them laden with the fruit of a ripe experience—a wise discrimination between observation and theory, and a comprehensive familiarity with the literature of each subject presented.

As regards the diseases of less frequent occurrence, those which more commonly fall under the observation of the expert, we find that the chapters on dysidrosis, and pomphylx, hæmatidrosis, scleroderma, morphœa, atrophia cutis, hypertrophy of the hair, atrophy of the hair, scrofuloderma, syphiloderma, and carcinoma have been those chiefly enlarged by important additions; and it is worthy of note that on those subjects, the contributions of the author to current literature have been in many cases of the greatest value.

The new articles all embrace subjects of special interest to Americans, as the rare diseases to which the attention of the reader is called are yearly of more frequent observation here, probably not because they are of increasing frequency, but because the labours of American dermatologists have directed such attention to them that they are more frequently recognized. It was said of Thoreau, by Mr. Emerson, that he expected one day to see the *Victoria regia* growing in the vicinity of Concord, and certainly the number of cutaneous diseases recognized abroad and hitherto supposed to be of the greatest infrequency in America, is rapidly diminishing. The new descriptions found here, relate to uridrosis, phosphorescent sweat, urticaria pigmentosa, dermatitis circumscripta herpetiformis, pityriasis maculata et circinata, dermatitis exfoliativa, dermatitis papillaris medicamentosa, dermatitis gangrænosa, dermatitis capillitii, fungoid neoplasmata, tuberculosis cutis, podelcoma, ainhum, perforating ulcer of the foot, and myoma cutis.

Doubtless there are those who will glance through a list of these names and be conscious of a sensation of dismay. The terms are many of them unfamiliar to the fairly well-educated physician. The subjects to which they refer are to him of small practical moment, he may conclude. Pos-

sibly he will dismiss the whole with a too common reflection, that dermatology is wedded to its cumbrous nomenclature and mysterious refinements above the level of the average intelligence. It is worth while to consider this reproach for a moment.

For it is a reproach which has not lacked public expression. The annual meetings of the American Dermatological Association have been criticized in our medical journals, in consequence of the time thus spent in discussion of rare forms of cutaneous disease; and it is sufficiently common to hear medical men of position and education admit their ignorance of the general subject of skin diseases, attributing this to the large number of rare forms of such maladies and the confusion existing with respect to their designation.

Now without stopping to charge these sins of nomenclature upon all other departments of scientific labour, we cannot fail to remember that, especially of late years, the terms employed in chemistry and perhaps more particularly in connection with new operations upon the female genitals, have been of the most complicated and perplexing character; it is, however, needful to note that the newer terms employed by the dermatologist are those connected with distinct pathological processes or the objective evidences of such processes, while the others to which we have referred are more generally the terms demanded by the refinements of art, or by the requirements of exactness in technical expression. To know the rule in dermatology, one must know the exceptions; to be able to pronounce with precision upon the most common of diseases, one must be positive in the exclusion of every other. The exceptions, though rare, are visible alike to physician and patient, and clamorously assert their identity in their behaviour. They betray their differences also in public, and to the eye of the individual who is not consulted as to their nature. Again, it is always necessary to get rid of the doctrines respecting ghosts, before one is in position to discuss a fact of nature. To establish the fact of a new or rare cutaneous disease, one is placed under the necessity of clearing away an incredible quantity of rubbish.

Look for a moment at the title given here "*Dermatitis exfoliativa*." The other names mentioned by our author under this head, as employed by writers, are, "*General Exfoliative Dermatitis*," "*Recurring Exfoliative Dermatitis*," "*Desquamative Scarlatiniform Erythema*," "*Recurrent Acute Eczema*," "*Acute General Dermatitis*," "*Recurrent Exfoliative Erythema*," and "*Scarlatiniform Exfoliative Dermatitis*." Here unquestionably there is need of a single term, by which may be understood the varieties of exanthem described by such writers as Baxter, Féréol, Fagge, Pye-Smith, and, among Americans, by such writers as Bulkley and G. H. Fox. Our author might have added here, the names also of Guibout, of Paris, and Jamieson, of Edinburgh, had the recent papers of these last-named gentlemen appeared before the book went to press. Surely this is a subject requiring attention in a treatise devoted to the consideration of cutaneous disease.

Here, again, we find the evidences of our author's conservatism. He restricts the use of the term we have given, to certain unusual and occasionally grave forms of disease, characterized by an acute erythematous, more rarely vesicular or bullous, inflammation, localized or generalized, accompanied by a more or less marked febrile disturbance, accompanied or followed by varying degrees of desquamation or exfoliation of the epidermis, and marked by a tendency to relapse. The disorder he thus

describes is to be distinguished from the recognized varieties of eczema and psoriasis, and from pityriasis rubra and pemphigus foliaceus. But how are these distinctions to be established, especially in face of the fact, that "much diversity of opinion exists as to the true nature of the cases . . . and it is difficult to determine from the reports whether they illustrate the same process or different diseases." Difficult, indeed, it is; one is strongly tempted to disregard alike authorities and minor differences of fact under the circumstances, and to agree with Jamieson that the term "general exfoliative dermatitis" should be made to include the very diseases from which we are here told that the conditions included by that term should be carefully differentiated.

Now it is in just such periods, when our knowledge of the different phenomena displayed under different circumstances by a single pathological condition is widening and deepening, that a wise conservatism is requisite. True, there is a wide distinction between typical cases of pemphigus foliaceus, for example, where the dried contents of a collapsed bleb furnish the material of the papery flakes cast off from the surface, and that disorder characterized merely by "bullous inflammation followed by various degrees of desquamation of the epidermis with a tendency to relapse." Yet the evidences of the existence of intermediate forms between these extremes are not wanting, and Jamieson (*Edinburgh Med. Journ.*, April, 1880, p. 879) cites several cases which it would be exceedingly difficult to assign exclusively to the one category or the other. One such has also been reported by ourselves (*Chicago Med. Journ. and Exam.*, Feb. 1881), under the title Pityriasis Rubra, where there was coexistence of very extensive epidermal desquamation, with febrile accesses of fatal termination, and where the surface exhibited marble-sized projections, which were found, post-mortem, to contain a creamy pus, and which served to give a particular character to the malady. We are not yet ready for a distinct recognition of all these rare and severe cutaneous manifestations as members of a single family, and yet, if the signs do not fail, to that complexion we shall eventually come. Our author has wisely given us a provisional recognition of these typical states, under the title "Dermatitis Exfoliativa."

We could in this way go over all the interesting ground traversed here for the first time, by one well qualified to pronounce with decision at every step, but we must be content by reminding those who find it necessary to consult a treatise of this sort, of the importance to themselves of possessing a brief yet precise description of each of the rarer cutaneous diseases, especially when it is requisite to come to a diagnosis by the processes of exclusion. It is for these reasons that we take especial pleasure in commending Dr. Duhring's book to the practitioner as well as to the student of medicine, and it is probably true that the marked success of the first edition was based upon its value in just this particular. Of it can be said now, even more confidently than on its first appearance, that it is the best treatise in the English language on the subject of diseases of the skin. As a text-book, it stands without a rival, and as a monument to the author's painstaking and indefatigable industry, it is one upon which he can well be congratulated. It is the production of books like this, which has brought to the profession in this country a degree of recognition and respect abroad which we could not in any other way have attained, and it is this which has held up to our own countrymen a standard of literary excellence in authorship which has proved of inestimable value.

The new illustrations in the chapter on anatomy of the skin are very

creditable drawings by Dr. Van Harlingen, and serve well to exhibit the relations between the protoplasmic bodies in the mucous layer, formerly described as hanging together by spines or prickles at their points, and clearly shown by Heitzmann to be generally connected by a thread-like network of living matter, traversing the lifeless cement substance between the epithelia.

The typography of the book is beyond criticism, and in other respects the publishers have done their part in its production with a most commendable success.

J. N. H.

ART. XLVII.—*Hernia, Strangulated and Reducible, with Cure by Subcutaneous Injections. Together with Suggested and Improved Methods for Kelotomy. Also an Appendix, giving a short Account of various New Surgical Instruments.* By JOSEPH H. WARREN, M.D., Member of American Med. Assoc. 8vo. pp. xii., 280. Boston: Charles N. Thomas, 1881.

THE full title of this work helps to give an idea of its contents and aim, the first of which is valueless, and the second apparently personal. Many books are written with the object of advancing the author's reputation, but in very few is that object so little concealed as in the volume before us. Sometimes there is associated with this selfishness of aim, intrinsic merit of greater or less amount; in this instance there is no such association, for we fail to see that surgical science gains the slightest addition from this book. The introduction is of interest as giving an account of the controversy between Dr. Heaton, the advocate of the boasted operation for the radical cure of hernia by injection, and the committee of the American Medical Association, a matter with which few of the present generation are familiar. Dr. Warren appears as the *quasi* apologist for Dr. Heaton, yet he fails to make out a case for him, and the impression left upon the mind of the reader is that the committee was right and Dr. Heaton wrong. It was simply the old story which has so often convulsed the ranks of the profession. Dr. Heaton practised an operation which he thought was of special value, and refused to make its steps or precise character known, thinking that by so doing he would increase his own emolument. As is so often the case, when the operation became known, it was found to be similar to one that had been before devised; Joseph Pancoast having resorted to injection four years before Heaton's first case, the only peculiarity of the latter's method being the substitution of an extract of white oak bark for the preparation of iodine used by the Philadelphia professor.

The author of this volume was made the recipient of Dr. Heaton's secret, and he valiantly endeavours to defend his actions on the score of youth and inexperience, with, however, very moderate success. But the history of this operation, and this old controversy, have served Dr. Warren a more important purpose. It has enabled him to come before the profession with certain trivial modifications of Heaton's methods, and, at the same time, to speak of his own "by no means small or limited practice," of his own "fine sense of touch and delicate manipulation." Altogether, there is a tone of immense superiority and acknowledged eminence (?) pervading the volume which may well induce the reviewer to hesitate be-

fore he criticizes, lest his criticisms be regarded as among "the rebuffs," and born of the "prejudice" which Dr. Warren, with rare foresight, anticipates in his opening sentence.

The body of the work consists of descriptions of the varieties of herniæ and of some of the operations devised for their radical cure. Dr. Warren prefers the operation by injection. The original contributions made by Dr. Warren, so far as the volume reveals them, consist of two; 1st, a modification of Heaton's syringe, the needle to which is flattened, and given a spiral twist, with the idea of facilitating its introduction; and 2d, a herniotomy knife, with a serrated edge, which can be guarded during its introduction. Dr. Warren is also inclined to think that he is the discoverer of the fact that torn arteries do not bleed as readily as those which have been cleanly cut, and, on page 240, he refers to one of his communications to the *Boston Medical and Surgical Journal*, where he details how he in the first place made traction upon certain bloodvessels and then divided them by a saw-like motion of the bistoury, and did not find it necessary to resort to ligatures! Before such an original observer, well may the reviewer hesitate to pronounce a judgment.

We feel that we have already taken up more than sufficient space by our notice of this book. The illustrations are quite numerous and very familiar, and many of them remind us of an instrument maker's catalogue. Dr. Warren's style is as marvellous as everything else about the volume, being involved and often ungrammatical in the highest degree. Of the printing and general style of get-up, it is enough to say that it is strikingly like the substance of the volume.

S. A.

ART. XLVIII.—*Health Reports.*

1. *Annual Report of the Board of Health of the State of Louisiana for the year 1880.* New Orleans, 1881. pp. 354.
2. *Annual Reports of the State Board of Health of Colorado for the years 1879 and 1880.* Denver, 1881. pp. 134.
3. *First Biennial Report of the North Carolina Board of Health, 1879-1880.* Raleigh, 1881. pp. 201.

1. A LARGE part of the *Louisiana Report* is occupied with statements and opinions in regard to the outbreaks of mild yellow fever recorded in the *National Board of Health Bulletin* for October 9, 1880, and which Prof. Joseph Jones, with many prominent physicians of New Orleans, considered to be only a variety of malarial fever, known under the local name of "rice fever." This unfortunate dispute has already been referred to in our columns, and we would therefore simply remark here, that the obvious lesson from its occurrence is in the future to secure so prompt and thorough an investigation, by representatives of all parties interested, of any "suspicious cases," that either there shall be no doubt as to their nature, or the party in error shall be conclusively condemned by the whole country, on the evidence of *subsequent* events.

Prof. Jones contributes valuable papers in regard to the existence of leprosy, and of yaws in Louisiana and the other Southern States, in the West Indies and in Mexico. From these it appears that leprosy, which is now comparatively a rare disease, was so common in the Delta of the

Mississippi River a hundred years ago, that a special hospital for lepers was founded about 1785 in the rear of the city of New Orleans. Dr. Jones reports having observed in Louisiana about twenty cases of elephantiasis Græcorum, or Oriental leprosy; five cases of elephantiasis Arabum, and three examples of that singular and loathsome disease, introduced it is believed by the slave trade, African yaws. His account is illustrated by four plates representing the ravages of leprosy, and the practical conclusions in regard to the existence of this malady upon the Bayou Lafourche are, that a sufficient number of persons have been affected with the disease to render it the duty of the State sanitary authorities to provide for the establishment of special leper houses, and that since some of the cases appear to have been contracted from contact or contagion, the practice of introducing patients suffering with leprosy into the crowded wards of any large city hospital, should at once be discontinued.

Elaborate mortuary statistics, suggestions of sanitary measures requisite for improving the health of New Orleans, and detailed reports from district sanitary inspectors make up the remainder of the book.

2. The volume from *Colorado* comprises the President, Dr. F. J. Bancroft's address, with a short paper on ventilation and clothing by T. G. Horn, M.D., of Colorado Springs, which make up the report of 1879, and a number of valuable essays forming the report of 1880. Dr. H. A. Lemen, of Denver, contributes an article upon the nature, causes, and prevention of typhoid fever, which enters very freely into the subject, and is followed by the history of an epidemic of typhoid in Denver in which our knowledge of the causation of this fatal disease is intelligently applied to explanation of its origin (as so frequently met with elsewhere) in the pollution of drinking water by sewage. Dr. H. K. Steele furnishes a series of aphorisms upon sewerage and house drainage, which might be committed to memory by every plumber's apprentice with advantage; Dr. Bancroft advocates the advantages of Prof. H. R. Storer's admirable plan for sanitary protective associations; and Dr. Dougan gives us some valuable and original observations upon the influence of the Denver altitude (10,000 feet) upon the human organism. Among these effects Dr. Dougan enumerates a marked stimulation of the whole system and an increase of the chest capacity. He admits the unusual frequency and great fatality of pneumonia and some other inflammatory affections, but claims that this is more than balanced by comparative exemption from malarial and zymotic diseases, so that the average influence of the climatic conditions in Colorado is favourable to health.

3. The Biennial Report of the *North Carolina* Board records a praiseworthy effort of the physicians of that State to gain for their fellow-citizens the blessings conferred by due regard to the laws of sanitary science. These blessings, however, we regret to see, are but imperfectly appreciated since the philanthropic secretary, Dr. Thomas F. Wood, of Wilmington, has been compelled to generously advance out of his own pocket over four hundred dollars for necessary expenses, the pittance of two hundred dollars annually being of course lamentably insufficient. It is to be hoped that the eyes of the State authorities may soon be opened wide enough to perceive that "public health is public wealth," and that to secure the latter by the former, a liberal expenditure is the truest economy.

To a detailed account of the establishment of the Board, and its auxili-

ary county boards of health, is added a number of appendices giving instructions as to the method of making autopsies; information respecting drainage, drinking-water, disinfectants, etc.; and an elaborate article upon sanitary engineering. Little or no originality is claimed for these circulars, which, however, are useful compilations likely to prove of great value to those for whom they have been prepared.

J. G. R.

ART. XLIX.—*Syphilis and Marriage. Lectures delivered at the St. Louis Hospital, Paris.* By ALFRED FOURNIER, Professeur à la Faculté de Médecine de Paris, etc. Translated by P. ALBERT MORROW, M.D., Physician to Skin and Venereal Department, New York Dispensary. 8vo. pp. 251. New York: D. Appleton & Co., 1880.

THIS book takes us back to the clinic rooms and the wards of the Hôpital St. Louis; and it is with the liveliest recollection of the earnestness and volubility with which the author used to enunciate “primo” and pass on to “secundo” that we find ourselves reading what once we caught as it fell from his lips. Yet, not exactly that; for the translator has not always hit the precise meaning of the writer, and more than a few times we find what sounded pathetic in France and in French to make a hard and disagreeable impression here and in English.

But, though there are many such infelicities, the substance of the original work is faithfully represented in the translation before us. This substance must now be pretty familiar to most of our readers, since abstracts of it have been very common of late in the medical periodicals. Fournier teaches that a man who has syphilis—not who has had it—may not marry; that a man who has been cured, as evidenced by an immunity from active manifestations for two years—may; and that if, by accident or wilfully, a man with an uncured syphilis marries, he must use the extreme measures to prevent the possibility of infecting his wife and begetting diseased children. An elaboration of these ideas and the statement of cases supporting them make up the most important part of the book before us. Incidentally other questions come up; as, for example, the still mooted one of paternal heredity. In regard to this, as is well known, Fournier believes a syphilitic father may impregnate a healthy woman, the foetus being syphilitic and the mother remaining healthy. He also believes that such a foetus, inheriting syphilis from its father, may, in utero, infect its mother, who thus becomes syphilitic “by conception.”

The unreliability of sulphur waters, as revealers of latent syphilis, is now too well-established to need much further argument; but Fournier ranges himself positively against the old belief that they had some value as a test.

The book before us has a scientific value proportioned to the rare opportunities and fine talents of its author. Beyond this, it discloses, with the effusiveness characteristic of his countrymen, those qualities of heart which have made him not only the respected but also the popular teacher that he is.

C. W. D.

QUARTERLY SUMMARY
OF THE
IMPROVEMENTS AND DISCOVERIES
IN THE
MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

Flat-foot in Young Infants.

The period at which flat-foot begins in children is one about which many different opinions are held by those who have large opportunities of making observations on the subject. It was a matter of dispute at a recent meeting of one of the medical societies, some maintaining that in cases of genu valgum the flat-foot always precedes, others that it always follows, the affection of the larger joint. Professor VOLKMANN, in the sixth number of the *Centralblatt für Chirurgie* (February 12, 1881), moralizes at some length upon the subject in connection with a paper by Professor Küstner in a recent number of *Langenbeck's Archiv* (Bd. xxv. p. 396). He says that it is well known that C. Hüter originated the theory that the alteration in shape of the comparatively *supinated* foot of the newly-born infant into the more *pronated* form which is characteristic of the adult, is brought about by the pressure exercised by the weight of the body. The axis of the astragalo-calcaneal articulation is so situated that the act of placing the foot on the ground forces it into the pronated position, and, therefore, according to Hüter, the bones and articular surfaces become modified into corresponding shapes under the influence of the pressure thus exerted. If this theory were true, observes Volkmann, not only should children who do not learn to stand and walk at the proper time retain the infantile form of foot, but this condition ought to persist in healthy children until the period of standing and walking begins. But this is not the case. Even in the first months of life the foot begins to lose its fetal form, and may have reached or even passed the normal adult shape before any attempt is made to put it to the ground. And it is also pointed out that in the not uncommon cases where a child, on account of disease or weakness, remains for fifteen or eighteen months without making any efforts at walking, we no longer find the fetal form of foot remaining. It is by no means rare, again, to find an actual flat-foot developed before the end of the eighth or tenth month. Taking these facts into consideration, Volkmann gives up the theory propounded by Hüter, and concludes that under ordinary circumstances the body-weight in walking and standing has nothing to do with this change of shape so interesting to the surgeon, which, in his opinion, depends much more upon hereditary influence. He shows that in newly-born infants many, if not all, the bones have a different form from those of the adult, and that the change from one to the other

takes place more or less rapidly, but often quite independent of any such forces as those under consideration. Some changes, indeed, appear to occur in opposition to such forces—as, for example, the increase in the angle formed by the neck of the femur with the shaft and the hollowing out of the sole of the foot, which does not occur until the child begins to stand and walk. That the latter does really occur in opposition to the force exerted by the weight of the body is shown by the fact that in so-called “static flat-foot,” which is obviously the result of this cause, the arch of the foot sinks at the same time that the eversion and abduction take place. The power, whatever it may be, which causes this arching of the foot may happen to be in excess of the counterbalancing force of the weight of the body, as is shown by cases of talipes varus and equino-varus, in which there is no greater mistake than to suppose that if the shape of the foot be sufficiently rectified to enable the sole to be placed flat upon the ground, the acts of standing and walking will be sufficient to retain the natural position. It is notorious that cases in this condition, if left alone, are almost certain to relapse. As to the special subject of flat-foot in young children, Volkmann attributes it to four principal causes: 1. Congenital, depending upon intra-uterine pressure. This form should be treated early and energetically. 2. That form which arises from a too rapid assumption of the adult shape of the foot. Treatment of this variety is invariably unsatisfactory. 3. Rickety flat-foot, which, though undoubtedly, as a rule, caused by the weight of the body, in some cases equally undoubtedly sets in before the child has made any attempt at walking. It seems, therefore, probable that the rickety process itself has an influence in determining the flattening of the plantar arch. 4. Paralytic flat-foot.

It will be noticed that Volkmann says nothing about the relation of flat-foot to genu valgum. We ourselves have been in the habit of looking upon the two conditions as occurring synchronously and independently as a result of the same cause. The question, however, does not seem to be one of very great practical importance. —*Med. Times and Gazette*, March 26, 1881.

MATERIA MEDICA AND THERAPEUTICS.

Action of Small Doses of Mercury upon the Lower Animals.

It was pointed out by Liégeois, upwards of ten years ago, that small doses of corrosive sublimate, administered during considerable periods of time to healthy persons, caused an increase in their body-weight. Keyes has published¹ some more recent investigations on the subject. He found that “small doses of mercury, continued for a short or a long period in syphilis, either alone or combined with iodide of potassium, increase the proportion of red corpuscles in the blood, and maintain them at a high standard. Further, mercury in small doses acts as a tonic upon healthy animals, increasing their weight. Lastly, it is a tonic in small doses to individuals in fair health who are not syphilitic. In such individuals, it augments the number of the red corpuscles.” Setting out from these data, SCHLESINGER (*Archiv für Exp. Pathol. und Pharm.*, Band xiii. Heft 5) administered small doses of mercuric chloride to herbivorous and carnivorous animals for long periods of time, and arrived at the following conclusions. No ill effects were ever observed to follow the treatment, in either rabbits or dogs. It may be regarded as certain that the animals so treated gain in weight, and that their blood contains an increased proportion of red corpuscles. *Post-mortem*

¹ Amer. Journ. of the Med. Sciences, Jan. 1876.

examination showed no deviation from the standard of health; nothing, indeed, beyond an unusual accumulation of fat in those regions where fat is normally present. No increase in the amount of urea excreted was ever noticed; albumen and sugar were never met with in the urine. While thus confirming Keyes' facts, the author dissents from his interpretation of them. He does not think that we are justified in ascribing tonic properties to mercury administered after this fashion. The increased number of red corpuscles, together with the accumulation of fat, point rather, in his opinion, to some influence of an inhibitory kind slowly and continuously exerted by the metal upon the processes of oxidation going on in the body.—*London Med. Record*, May 15, 1881.

Antipyretic Action of the Phenols.

Professor LICHTHEIM (*Breslauer Aerzt. Zeitschr.*, 1881, No. 1) regards the alarming symptoms observed by Jänicke during the use of resorcin as the result, not of the direct action of the drug, but of the rapid rise of temperature following the cessation of its action. Professor Lichtheim has made experiments also with the two other members of the dihydroxylbenzol group, hydroquinone and pyrocatechin, and also with phenol (carbolic acid), in relation to their antipyretic action when given internally. From these experiments, it appears that there is a distinct and concomitant parallelism between the antifermentative and antipyretic actions of these substances. In order of antipyretic doses, they stand as follows: phenol, $4\frac{1}{2}$ to 6 grains; then hydroquinone, 12 grains; and pyrocatechin, 15 grains; weakest of all, resorcin, 46 grains. Owing to the fleeting reduction of temperature, and the subsidiary actions produced, Professor Lichtheim's opinion is that these drugs will not stand comparison as antipyretics with quinine and salicylic acid.—*London Med. Record*, May 15, 1881.

Apomorphia as an Expectorant.

BECK concludes (*Deutsche Med. Wochen.*, Feb. 1881) that apomorphia is decidedly superior to ipecacuanha, antimony, and the preparations of ammonia, in the treatment of bronchial catarrh, whether of primary or of secondary origin. It should be given in the first stage of the disease, when the cough is dry, and only sonoro-sibilant rhonchi are heard over the chest. Within twenty-four hours free expectoration sets in, and bubbling crepitation takes the place of the dry sounds. In the broncho-pneumonia of children, it should be given during the stage of resolution, to promote the expulsion of the inflammatory products from the bronchi. In acute laryngitis, its usefulness is very doubtful. The following is the prescription employed by the author: Hydrochlorate of apomorphia, gr. j; dilute hydrochloric acid, ℥xx; syrup, ℥j; distilled water, ℥iv. Of this mixture, a teaspoonful may be given every hour to children between three and ten years of age. Adults may take a tablespoonful every three or four hours. Given in this way, apomorphia does not give rise to nausea, or disturb digestion.—*London Med. Record*, April 15, 1881.

Intra-Peritoneal Transfusion.

To obviate many of the difficulties and dangers of intra-venous transfusion Ponfick has introduced a method of injecting defibrinated blood into the peritoneal sac, and has availed himself of the rapid absorption occurring from serous surfaces. His example has been followed by others, and KACZOROWSKI has recently published his results in the *Deutsche Med. Wochenschr.* He employed the method first in a case of puerperal septicæmia, and then in five other cases of anæmia

and extreme exhaustion. He injected from 250 to 500 centimetres, and in one case repeated the larger quantity. In one case only was there no substantial result. The local reaction of the puncture, which he recommends should be done under antiseptic precautions, he found to be very slight, and even the entrance of pure air to be harmless. He recommends that intra-peritoneal transfusion should be practised in cases of protracted fever where there is threatened paralysis of the heart, and also in chronic anæmia without fever.—*Lancet*, March 26, 1881.

MEDICINE.

Transfusion of Blood in a Case of Acute Typhoid Fever complicated with Intestinal Hemorrhage.

This case, reported by GIBERT (*Bull. de l'Acad. de Méd.*, March 29, 1881), was that of a patient attacked by typhoid fever, in the first instance without any special characteristics, which at the end of thirty-one days, suddenly manifested peculiar symptoms: first, a state of syncope, followed shortly after by great restlessness, at the moment when a small bloody evacuation appeared for the first time. In a fit of great excitement, the patient having got out of bed, and in the midst of the struggle to put him into bed again, evacuated *per anum* about 1500 grammes of coagulated blood, extremely fetid, evidently proceeding from a mesenteric artery. Delirium supervened, as well as such a state of weakness that believing death to be near, Dr. Gibert attempted during the course of the night transfusion of blood, an operation in which, in consequence of operative difficulties, he thought he could only inject from 25 to 30 grammes of blood. The general condition being rather more satisfactory, a second injection of 90 grammes of blood was performed the following morning. A sudden and lasting improvement showed itself immediately, of which the brain was the first to feel the effects; the heart beat normally, and the first sound became perceptible. Cardiac impulsion was felt, and the patient, aroused from his death struggle, was able to take nourishment. Convalescence soon set in, and the cure is at the present time complete. M. Gibert is uncertain whether this case of transfusion is exceptional and without value, from the point of view of general pathology, or whether it is a case which should guide the physician. Whenever the typhoid patient, especially when he has lost much blood, is in an organic incapability of living if the blood is not renewed, which is often the case—if at this moment the physician intervene by transfusion, he will more often than has been hitherto believed have the chance of saving life.—*London Med. Record*, April 15, 1881.

Diagnosis of Yellow Fever for Sanitary Purposes.

Dr. S. M. BEMISS, in an excellent paper read at the late meeting of the Louisiana State Medical Society (*New Orleans Med. and Surg. Journal*, May, 1881), laid down the following propositions which were unanimously endorsed by the society:—

I. For sanitary purposes the following groups of symptoms shall be considered to indicate yellow fever:—

Group 1st.—A person after (a) a sudden attack, has (b) a fever of one paroxysm, attended with (c) marked congestion or blood stasis of capillaries of surface, conjunctivæ, and gums; with (d) a history of probable exposure to infection, and (e) no history of a previous attack of yellow fever.

Group 2d.—A person after (a) a sudden attack, has (b) a fever of one parox-

ysm, followed by (c) unusual prostration, (d) albuminous urine, (e) yellowness of conjunctivæ, or skin, and having no positively authenticated history of previous attack of yellow fever.

Group 3d.—A person has (a) fever of one paroxysm, (b) albuminous urine, (c) black vomit, or (d) suppression of urine, (e) general hemorrhagic tendency under (f) circumstances where exposure to infection is a possibility.

II. Suspicious cases of yellow fever for sanitary purposes.

The following symptoms associated with a fever of one paroxysm in a patient who has apparently been exposed to infection and has never had yellow fever, shall be held to justify in either of the six following cases a suspicion of this disease, viz. :—

First, suddenness of attack either with violent pain in the head and back, injected eyes and face, or with marked congestion of the superficial capillaries.

Second, want of that correlation between pulse and temperature usual to other forms of fever.

Third, albuminous urine.

Fourth, black vomit.

Fifth, general hemorrhagic tendency.

Sixth, yellowness of skin.

The following cases shall also be deemed suspicious :—

Seventh, any case respecting which reputable and experienced physicians disagree, as to whether the disease is or is not yellow fever.

Eighth, any case respecting which efforts are made to conceal its existence, full history, and true nature—in violation of Sec. 27, City Ordinance, June 24, 1879.

In the event of death of a suspicious case a post-mortem examination should be made when practicable. Both before and after death, yellow fever is specially and pre-eminently characterized by the fact that it is, *par excellence*, a hemorrhagic fever, marked by capillary congestion and its sequelæ; hence, post-mortem evidences of a general hemorrhagic tendency in internal organs, especially in the digestive in preference to the urinary tract, shall be held to confirm the suspicion.

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Syphilis and Locomotor Ataxy.

In a communication to a recent number of the *Centralblatt für d. Med. Wissenschaften*, Erb has published an additional and important series of facts regarding the relation of syphilis to locomotor ataxy. They are in perfect agreement with the results which he has previously published, and with those brought forward by Dr. Gowers in our columns (*The Lancet*, January 15, p. 94). Of one hundred consecutive cases of tabes, only twelve gave no history of a chancre or secondary symptoms. In fifty-nine there was a history of secondary syphilis, and in twenty-nine of a chancre without secondary symptoms, making a total of eighty-eight in which there was either a venereal sore or constitutional syphilis. Of the twenty-nine cases with a chancre only, eleven were known to have been so treated (with mercury or iodide) as to make it probable that the sore was a hard one. The interval between the primary sore and the first symptoms of the ataxy was ascertained in eighty-eight cases, and it was between three and five years in seventeen cases, between six and ten years in thirty-seven cases, between eleven and twenty years in twenty-four cases, and more than twenty years in ten cases. In order to ascertain the truth of the objection that the large percentage of cases of ataxy with preceding venereal sores or constitutional syphilis is due simply to the commonness of the latter, Erb has investigated the history of four hundred individuals over twenty-five years of age, who were

under treatment for diseases which were not suspected to have any relation to syphilis. The percentages of each hundred agreed very closely, and for the whole four hundred was—a history of a chancre only, 11 per cent. ; a history of secondary syphilis, 12 per cent. ; and no history of either chancre or constitutional syphilis in 77 per cent. Thus, 23 per cent. had had a chancre or constitutional syphilis, while among the ataxic patients taken from the same social classes the proportion was no less than 88 per cent. Erb concludes that these figures justify the assumption that there must be an etiological connection between syphilis and locomotor ataxy.—*Lancet*, April 9, 1881.

Bromide of Ethyl in Epilepsy.

DRS. BOURNEVILLE and OLIER publish in the *Progrès Méd.* for March 26 a paper giving an account of some trials they have made at the Bicêtre of inhalations of bromide of ethyl. These trials have not been made on many persons or continued for long periods, so that the conclusions they have arrived at can only be regarded as provisional. They are as follows : 1. Dilatation of the pupil at the commencement of the inhalation is by no means constant. 2. Complete muscular resolution is exceptional. 3. Anæsthesia is produced in very variable degrees in different subjects. 4. The temperature, the secretions, and the general condition do not seem to undergo any modification. 5. The pulse and respiration are slightly accelerated. 6. A more or less marked tremor of the limbs may be produced during the inhalation, but it does not persist after this has finished. 7. Hysterical attacks are usually arrested easily. 8. Epileptic attacks may sometimes be arrested by employing the remedy during the tonic period ; but generally the inhalation exerts no effect. 9. In epilepsy, the regular daily employment of the bromide for a period of one or two months very notably diminishes the frequency of the fits.—*Med. Times and Gazette*, April 9, 1881.

Treatment of Neuralgia by Salicylate of Soda.

M. LABBÉ has used salicylate of soda in the treatment of neuralgia (*Rev. de Thérapeutique*), and has obtained good results in cases of suborbital neuralgia, and of sciatica, which had resisted sulphate of quinine. One of these patients was diabetic, but M. Labbé believes that glycosuria does not present any counter-indication for the use of this drug. Since that time M. Labbé has not been so successful with the same treatment ; and in the case of a young girl who had taken the salicylate without any result, he afterwards found that sulphate of quinine brought on a notable improvement. He is of opinion that salicylate of soda is only successful in rheumatic persons. He prescribes it in doses of 8 grammes (120 grains) for the first two days, and 4 grammes on the third. It should be taken before meals twice or thrice during the day, and a little Vichy water should be subsequently drunk. M. DUJARDIN-BEAUMETZ remarks that the treatment of neuralgia by salicylate of soda is a well-known method. Germain Sée and Descroizelles have recorded excellent examples of it. In certain cases, as has been demonstrated by Luys, the acute pains of ataxic patients have been relieved by this method ; however, it is not yet generalized, and the treatment of neuralgia by salicylate of soda is still an exceptional fact. The reason is that, in the first place, this medication is uncertain ; and if it is sometimes successful, it fails utterly in many more numerous cases ; and, from this point of view, salicylate of soda is greatly inferior to aconitine. The second reason is, that sometimes the use of large doses of salicylate of soda produces very bad internal results. It has not been easy to explain why salicylate of soda has so injurious an action in cer-

tain persons, but it is none the less true that this drug, in doses of eight or ten drachms, is sometimes found to produce a very marked depression of the circulation, bringing on a notable lowering of the cardiac pulsations.—*London Med. Record*, April 15, 1881.

Neurotic Atrophy.

Professor VIRCHOW (*Berl. Klin. Woch.*, No. 29, 1880) brought before the Berlin Medical Society two cases of neurotic atrophy, of the type to which he would apply the term "circumscribed," to distinguish from those cases of crossed and hemi-atrophy due to lesions of the nervous centres. One of the cases shown, a man named Schwahn, was the original case upon which Romberg founded his doctrine of tropho-neurosis, and of which Professor Virchow has notes taken by himself in 1859. The other case was a woman. In both the face was the principal part affected, the atrophy affecting one half. In the man's case, the bones were affected, because the disease began during development. In the woman, the bones were unaffected, the condition having commenced when she was 25 years old. Professor Virchow pointed out that the facts do not support the view that the atrophy depends on vaso-motor spasm; the vessels are easily seen, and the skin reddens very readily when rubbed; there is no definite alteration of sensation, though here and there slight numbness is complained of; there is no true paralysis of the muscles; they are only weakened by their bad nutrition. The affection does not involve the whole area supplied by particular nerves or branches of nerves, but only portions of those areas. The distribution of the lesions in both cases was described by Dr. Virchow. In the man's case, the origin of the condition was when he was nine years old; he had swelling of the entire neck and region at the angle of the lower jaw, which got well in a week; the skin at this part became pigmented, but in other places the atrophied patches are notably white. Dr. Virchow believes that the atrophy had made no progress since his former notes were taken in 1859. The woman's case began after a confinement, but the relation to the confinement is not clear, as it was six months or a year afterwards that she first noticed anything. As in Schwahn, the first symptom was inflammatory swelling, in her case near the left eye. A little after, she slipped down and struck the back of her head. There is no abnormality now to be found at the seat of the blow. Dr. Virchow refers to some published cases, in which a blow has been assigned as the exciting cause. In conclusion, he says that complete anatomical examination has never been made on one of these cases, and that there are few phenomena in the range of neuropathology which so much need explanation, or in which nature apparently offers so neat an experiment for distinguishing the different kinds of fibres in the peripheral nerves.—*London Med. Record*, April 15, 1881.

Atrophic Infantile Paralysis.

M. ONIMUS has just written a paper, entitled "Considerations on the Etiology and Diagnosis of the Atrophic Paralysis of Childhood," in which he asserts (*L'Union Médicale*, April 3d) that the examination of the very much weakened electro-muscular contractility by induced currents, and less frequently by continuous currents, is the only criterion by which to distinguish infantile hemiplegia, or the peripheric paresis of the muscular groups, from the atrophic paralysis of childhood, most generally due to changes in the cells of the anterior cornua of the spinal cord. M. Onimus proves, by cases observed, that chill is the most frequent cause of this disease, by directly bringing on congestion of the gray substance of the atrophic nerve-cells. In certain cases, however, the rheumatismal influence

primarily affects the muscles and the peripheric nerves, in which inflammation sets in at once. It is especially in the spring, summer, and autumn, more than in winter, that this disease originates, by transition from heat to cold, and from imprudences committed at this period of the year. M. Onimus is convinced that modifications of circulation in the divers organs of locomotion are more logically the cause of the atrophic paralysis of childhood, than dentition, heredity, breast-milk, or the so-called internal convulsions.—*British Med. Journal*, April 23, 1881.

Paradoxical Muscular Contraction.

Professor WESTPHAL has given the above name to the phenomenon which he describes as follows (*Archiv für Psych.*, Band x.). If, in certain diseases of the central nervous system, we quickly and strongly flex the ankle of the patient while lying in bed (occasionally slow flexion will also succeed), we find that the foot left to itself remains in the position given to it, not sinking by the force of gravity into the natural position. On observing the tendon of the tibialis anticus, we find that a moment after the flexion it suddenly starts out and remains in this condition. Corresponding to the action of the tibialis anticus, the foot is adducted. The foot remains in this position for some time (on one occasion observed by Professor Westphal for twenty-seven minutes), and then sinks gradually into its natural position. Dr. Westphal named this phenomenon "paradoxical muscular contraction," because here the passive shortening of the muscle acts as a stimulus, and this method of producing a contraction is in direct opposition to the method already described by Erb and himself, viz., by sudden extension or concussion. Dr. ERLENMEYER adds (*Centralb. für Nervenheilk.*, 1880, No. 17) that he finds patients are unable by voluntary contraction of the antagonists to overcome this contraction of the tibialis anticus. He has seen the contraction last for three-quarters of an hour. As to the cause, Dr. Erlenmeyer believes that it lies, not in the relaxation of the tibialis anticus, but in the lengthening or extension of its antagonist, the gastrocnemius. To prove this, he instituted two experiments, in the first of which he considers that he changes the lengthening of the gastrocnemius into a shortening; in the second, that he prevents altogether the extension or lengthening of the muscle. To accomplish the first object, he flexes the knee, and pushes with the hand the muscle of the calf towards the heel, a proceeding he found possible for a distance of nearly an inch. The contraction of the tibialis anticus fails in every such experiment, he says, the foot falling directly into its natural position. To accomplish the second object, he uses either the same method as the last, or with the knee flexed as before, he pushes the calf-muscle so far towards the knee that the ankle can still be fully flexed without resistance. In both cases the contraction of the tibialis anticus fails. He considers that here we have a tonic muscular contraction produced by extension of an antagonist, and differing in character from the foot-clonus or "foot phenomenon" of Westphal, which results from passive restraint of clonic spasms in a muscle stimulated by its sudden extension. He proposes for it the name "muscle phenomenon." Dr. Westphal (*Centralb. für Nervenheilk.*, 1880, No. 26) replies to the above. He says it is not the pushing upwards or downwards of the calf-muscles that prevents the occurrence of the phenomenon, but the pressure on the muscles, which acts as a mechanical stimulus, producing extension of the ankle-joint. He had already weighed and rejected the propositions made by Dr. Erlenmeyer.—*Lond. Med. Record*, April 15, 1881.

Epidemic Cerebro-Spinal Meningitis of Children.

Dr. O. MEDIN has given (*Nordiskt Medicinskt Arkiv*, vol. xii., 1880) a detailed account of the progress of epidemic meningitis among the nurslings of the great Orphan Institution of Stockholm in the period from 1842 to 1876. During these thirty-five years only two great epidemics were observed among very young children—one in the years 1848 to 1851, and the other in 1856. In the first epidemic, 156 children were attacked and 134 died; in the second, 32 were attacked and 24 died. But besides these epidemics some cases presented themselves in groups of small epidemics, as in 1857, 1865, 1868, and 1875-6. In reference to etiology and pathogenesis, the author finds that the outbreak of the disease shows a positive relation with the season of the year, the greater part of the cases occurring in winter and spring; but this difference appears to depend rather upon some social arrangements as to lodgings in Stockholm than upon the influence of the seasons. Dr. Medin regards cerebro-spinal meningitis as a miasmatic infectious disease, while some cases appear to indicate a contagious miasm; and he thinks that the channel by which the infection is communicated to the perinervous lymphatic system is furnished by the lymphatic spaces of the nasal mucous membrane. He never observed any instance of transmission of the disease to a wet-nurse or an ordinary nurse, and he found very few cases among the children above one year old nursed in other wards of the Institution, and moreover he found that the disease was exclusively confined to nurslings. Hence he regards the epidemic meningitis of the great Children's Hospital as a disease peculiar to the earliest age, and he has accordingly named it *the cerebro-spinal meningitis of children*. Some of the cases were abortive, and some resulted in recovery; but the fatal cases, which constituted the large majority, were marked by the following characters. The invasion of the disease was frequently preceded by cough, and the child generally became ill during the night, with restlessness, fever, heat of scalp, sometimes vomiting, often sleepiness, refusal of breast-milk, and startings in sleep. This state lasted for one or two days, sometimes more, with remissions and exacerbations, the latter generally in the night. Afterwards more violent symptoms supervened, such as intense fever with burning scalp, change in the colour of the face, prostration, drowsiness, loud cries with convulsive movements of the extremities, wildness of the eyes; the fontanelle was often swollen, the face destitute of expression, the eyes half-closed or wide open, pupils most frequently contracted, transient convergent strabismus, slight twitchings of the face. Periodical contractions of the muscles of the trunk and extremities were frequently observed; the skin was almost always hyperæsthetic, the respiration often disturbed, the belly distended, the stools frequent and loose, the urine often albuminous. The course of the disease was subject to frequent remissions, but death supervened in from two to four days; and in other cases the progress was more rapid and lasted only one or two days. As to the general nature of the malady in question, Dr. Medin regards it as an infectious epidemic essentially resembling the epidemic cerebro-spinal meningitis of adults, only distinguished from it by its almost exclusively attacking children at the earliest age. As to its symptomatology and anatomical characters, it is marked by inflammation with purulent exudation in the perinervous lymphatic system, as well as by alterations in many other organs of the body, thus revealing the constitutional nature of the affection. It must be referred to the category of miasmatic infectious diseases with localization in a certain part of the areolar tissue. The *diagnosis* is difficult from the occasional absence of the characteristic symptoms; and the affections for which it may be mistaken are tubercular meningitis, thrombosis of the cerebral sinuses, nervous disturbances of motility, intermittent fever, and infan-

tile cholera. The *prognosis* is unfavourable, and death is almost certain in the advanced cases; and sequelaë were observed in one child three years after it was cured. In this case the child was deaf and dumb, and exhibited slight paresis of the tongue and of the left leg. The *treatment* offers no remarkable feature except in a prophylactic point of view; and as a result of the enlargement of spaces in the city, and better ventilation, the disease has diminished in frequency of late years. The tables drawn up by the author from his own experience show conclusively that the deaths from cerebro-spinal meningitis increase as the cubic space afforded to the patients in the wards diminishes, and *vice versâ*. Children at a very early age require much space and fresh air.—*Med. Times and Gaz.*, April 16, 1881.

On Hypnotic Contractures.

The strange phenomena of hypnotism are elicited with readiness in the subjects of hysteria, and have been for some time the subject of special study at the Salpêtrière by M. CHARCOT. His latest investigations (described at a recent meeting of the Société de Biologie) have been chiefly directed to the phenomena of muscular contracture, which is readily obtained by the mechanical stimulation of the tendon, of the motor nerve, or of the substance of the muscle, so that it can readily be localized in a single muscle or group of muscles. This contraction is very intense, and fixes the limb in a given attitude with a force which cannot be overcome even by energetic efforts. When the hand is closed thus it cannot be opened by any force which can be applied to it. Nevertheless, it can be at once relaxed by mechanical stimulation of the antagonists, such as is afforded by gentle rubbing of the extensors of the hand; the fingers are at once extended, and the contracture disappears as if by enchantment. If the contraction is not thus relaxed, when the patient is awaked one of three things may happen: (1) The contracture may disappear, the patient recovering with consciousness, and the liberty of all movement. (2) If the patient is rendered cataleptic the contracture may continue after the awaking, being, as it were, fixed by the catalepsy. (3) In some cases the contracture persists, although the patient is not rendered cataleptic.

The patients who preserve the contracture after the recovery of consciousness present the closest resemblance to hysterical patients affected with permanent contracture. Friction of the antagonists is powerless to resolve it. A magnet applied near the fixed limb only increases the contracture, but applied to the opposite limb it causes the curious phenomenon of the transfer of the contracture. This changes its place to the opposite side, but does not yield to the magnet. To remove it the patient must be again placed in the hypnotic state, when the stimulation of the antagonists suffices to make it disappear. In most cases the change of contracture occurs in all the muscles of a limb, but it has also been found that when only a few muscles are affected by the contracture, the transfer involves exactly the same muscles of the opposite side; and this is true however the first contracture may have been brought about. Anæmia of a limb, such as is produced by Esmarch's bandage, hinders the development of the neuromuscular hyper-excitability, as Brissaud and Richet demonstrated. If, for instance, a limb is thus treated, the patient hypnotized, and the muscles of a limb are rubbed, no contracture is induced; but as soon as the current of blood is restored, the contracture occurs, without any further stimulation. Hence it seems that in the anæmic limb there is a sort of potential contracture. The impulse is received by the nerve centres, and is preserved there until the re-establishment of the current of blood, restoring to the muscles the ability to contract, permits it to manifest itself. This latent contracture may be transferred by the

magnet from one limb to another on the opposite side, just as may be the developed contracture. As an illustration of the method of obtaining these results an instance is described in detail. The patient, having been hypnotized, is in a state of lethargy, with muscular hyper-excitability; but it would not do to apply Esmarch's bandage while she is in that condition, because the mechanical stimulation would probably cause a contracture of the whole limb. The patient's eyelids are therefore raised. She at once becomes cataleptic, the limbs retain any position in which they may be placed, but the muscles have ceased to be sensitive to mechanical excitation. Advantage is taken of this loss of excitability to apply the bandage. The eyelids are then pressed down. The catalepsy at once ceases, the patient resumes the condition of lethargy, and the muscles recover their excitability. Then, without touching the limb elsewhere, a small button is pressed several times against the ulnar nerve behind the elbow. No effect follows until the bandage is removed, and then, as blood returns to the limb, the hand slowly assumes the position due to contracture of the muscles supplied by the ulnar nerve, especially the interossei. In this experiment the excitation of the ulnar nerve has impressed the nerve centre in a peculiar way, but only in the parts corresponding to the ulnar nerve. The nerve action for the contracture in the muscles supplied by the nerve takes place in the nerve centre, but not in the periphery until the return of blood to the muscles restores their contractility. Again, the patient being asleep, the arm is anæmiated. The ulnar nerve is then stimulated, of course without effect. Nevertheless, the spinal cord has been influenced, and if the circulation were to be restored the contracture would come on. But if, instead of this, a magnet be applied to the other arm, the contracture is produced in this in exactly the same way as if it were actually transferred from the first side. The lateral contracture has been transferred. These phenomena, in the opinion of M. Charcot and M. Richet, are evidence of the reflex nature of the neuro-muscular hyper-excitability, whether produced by the mechanical stimulation of a nerve, a muscle, or a tendon.—*Lancet*, May 7, 1881.

Treatment of Diphtheria.

WEISE states (*Berl. Klin. Wochen.* No. 4), as the result of his experience of Guttman's treatment of diphtheria by pilocarpin, that it produces an excellent and rapid effect in many cases. His own treatment, under which he has had fifty-four cases without a death, is with salicylic acid and benzoate of soda. Every hour and a half the patient inhales, or has his throat painted with, a solution of salicylic acid (one part, by weight, to fifty of glycerine and rectified spirit in equal parts), and at the same time takes benzoate of soda internally, and stimulants. The inhalation is given with an instrument constructed by Dr. Weise, consisting of a small spray-apparatus combined with a tongue depressor.—*London Med. Record*, April 15, 1881.

Treatment of Pharyngeal Diphtheria.

Dr. OERTEL directs his treatment (*Archives of Laryngol.*, Jan. 1, 1881), first, to the destruction of the cause of the disease; and second, to the removal of the products from the affected parts. For the former, he thinks carbolic acid a most efficient remedy. When the results obtained from its use have been unsatisfactory, the solution has not been sufficiently strong. Of twenty-seven of the graver cases which have been treated by Dr. Oertel, he believes that three-fourths would have ended fatally but for the use of carbolic acid. He employs a five per cent. solution nebulized by means of a steam-atomizer, and avoids the use of a brush or sponge, as he thinks these only irritate the parts. He considers the absorption of the carbolic acid

by the lymphatics of the oral and pharyngeal cavity exceedingly important, for the purpose of making the absorbed mucous products harmless. He further believes in a beneficial influence exerted by carbolic acid upon the blood. A rapid amelioration of the disease always appeared with the excretion of dark, olive-green urine. The inhalations are made every two or three hours, or even oftener, and last from two to five minutes, according to the severity of the disease and the strength of the patient. As the patient improves, the inhalations are made less often, and are of shorter duration. If the urine change colour strikingly, or if gastric disturbances occur, the inhalations are reduced in number. If the urine become dark-coloured, they are discontinued for twenty-four hours, and other solutions, such as one containing from two to four per cent. of boracic acid, or five per cent. of benzoate of soda, are substituted, the carbolic acid treatment being recommenced when the urine has regained its natural colour. To hasten the separation of the diphtherial membranes, Dr. Oertel advises two methods: 1. The loosening of the membranes by suppuration; 2. The mechanical raising of the membranes by exciting increased secretion of mucus. The first method mainly involves the employment of heat, which promotes suppuration, and thereby demarcation and separation of the membranes. Hot vapours or steam are used, for a quarter of an hour at a time, from four to eight times a day, together with the carbolic acid treatment; and under these means the extension of the diphtherial deposits soon ceases. The hot inhalations are reduced in number when the separation is fairly progressing, but the carbolic acid is continued for two days, to prevent a renewed infection of the mucous membrane. Dr. Oertel finds other local remedies decidedly inferior to carbolic acid. Lime-water and lactic acid, though able to swell and dissolve fibrinous coagula, possess no antiseptic or disinfectant properties, and are not indicated in pharyngeal diphtheria, as in the mouth and pharynx there is no danger of stenosis. To stimulate the secretion of mucus underneath the deposits, and so mechanically to lift them up, and at the same time to remove the fungous growths and septic matters from the mouth, Dr. Oertel uses muriate of pilocarpin, which he gives in doses of one to five centigrammes (0.15 to 0.75 grain) dissolved in water. The rapid separation of the membrane, which took place in a case accidentally complicated by salivation, led Dr. Oertel to try this remedy. In adults, when the morbid process has lasted some days, he makes a subcutaneous injection of from one to two milligrammes (0.015 to 0.03 grain) of pilocarpin.—*London Med. Record*, May 15, 1881.

Pericarditis Treated by Incision into Pericardium.

Dr. ROSENTEIN, of Leiden, relates (*Berliner Klinische Wochenschrift*, No. 5, 1881) a case of purulent pericarditis, treated by a free incision into the pericardium much as we now treat some cases of purulent pleurisy. A boy, ten years of age, came under observation after having been attacked fourteen days previously with symptoms of gastric catarrh. On admission into hospital, the following was noted as the *status præsens*:—"The patient lies by preference on his back, though on either side position does not cause any inconvenience. Nutrition is good; cheeks and mucous membranes remarkably pale; axillary temperature 99.8° Fahr.; pulse very small; respiration 40, costo-abdominal; *alæ nasi* working strongly. The chest measures, at the level of the third dorsal vertebra, on the right side thirty-four, on the left thirty-six centimetres; at the level of the sixth dorsal vertebra, right side thirty-six, left side thirty-seven centimetres. The heart's beat is neither to be felt nor seen, nor are the heart-sounds audible at any part of the chest. On percussion, on the right side the percussion-sounds are normal as low as the sixth rib; on the left side, dulness commences between

the first and second ribs, and gradually extends to the xiphoid cartilage, passing obliquely towards the left as far as the mid-axillary line, and to the right as far as the nipple-line (thus presenting a somewhat triangular space, apex up and base downwards). There is no change in the dulness on altering the patient's position. . . .” A diagnosis of effusion into the pericardium was, of course, made; but its exact nature could only be determined by an exploratory puncture, and this was done. The presence of pus having been made certain, aspiration (between the fourth and fifth ribs, close to the margin of the sternum) with a Potain's apparatus was practised, and upwards of twenty-two ounces of pure pus were withdrawn. The relief afforded by this operation is compared with that which so often follows tracheotomy for laryngeal obstruction. The relief, however, did not last very long, and it became necessary to repeat the tapping on the third day, but the pericarditis was not found to be associated with a left pleurisy, which had developed since the first tapping. The pleura was accordingly tapped, and thirty-eight ounces of serous effusion were withdrawn. The pericardium was again tapped, and about four ounces of pus taken out. The patient's condition did not much improve: there was very considerable and increasing dyspnoea, with lividity, and some œdema of the feet and legs; sleep was much broken, and the general condition very low. Under the circumstances, it was determined to incise the pericardium, as the physical signs pointed pretty conclusively to a further accumulation of fluid within it. The operation was carried out under the strictest antiseptic precautions. An incision, about three centimetres long, was made between the fourth and fifth ribs, close to the left margin of the sternum, and each layer separately divided until the pericardium was reached. An opening was then made into it, through which a considerable quantity of pus escaped; two drainage-tubes were put in, and the wound dressed after Lister's method. The patient was, very shortly after the operation, able to lie on his back, and felt much relieved by it. It was not, however, until at least two hours later that the pulse became appreciable. On the day following, the temperature stood at 101° Fahr., but it then came down to normal and remained so. At the end of eight weeks, the pericardial wound, which had been gradually closing, was cicatrized. There were no further pericardial troubles. But the signs of the pleuritic effusion pointed to a fresh collection in this cavity, while there was still fever after removing thirty-five ounces of fluid; as the general condition therefore was not relieved, a free incision was made into the chest, and another fifty ounces were removed. Improvement now set in, and at the end of six weeks the wound had closed, and the patient was sent out of the hospital cured.

The author draws the following conclusions from his case:—1. The case teaches that purulent pericarditis, just as empyema, may at times run its course without giving rise to fever or œdema of the tissues, so that the nature of the exudation can only be decided after an exploratory puncture. 2. We must not abstain from removing the exudation on account of any supposed myocarditic changes. 3. In cases of considerable pericardial effusions, change of position may not influence the line of dulness; but this fact must not always be interpreted in favour of dilatation of the heart.—*Med. Times and Gazette*, March 19, 1881.

Adult Cephalic Murmurs.

M. TRIPIER (*Revue de Méd.*, Feb. and March, 1881) points out that a cephalic murmur is found in adults, and that he has observed it in several chlorotic patients, and in one case of each of the following: metrorrhagic anæmia, pernicious anæmia, intra-cranial tumour, and hydrocephalus. It is a systolic murmur, and is best heard over the temples, especially on the right side. It is not at all

influenced by change of posture, but can be modified or suppressed by pressure on the carotids, and it diminishes or increases according as the patient improves or retrogrades. It is not transmitted from the heart, but is of local origin, as in some cases no cardiac murmur was present. M. Tripier has never met with the continuous cephalic murmur.—*London Medical Record*, April 15, 1881.

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Examination of the Local Sensibility of the Precordial and Pre-Aortic Regions in Diseases of the Heart.

The examination of the local sensibility of the precordial and pre-aortic regions will, Dr. PÉTER believes (*Revue Méd.*, Jan. 8th, 1881), become, in course of time, as necessary and usual as auscultation and percussion. It has for its object the investigation of the state of sensibility of the heart—that is, of its muscles and ganglia; the cardiac plexus; the pneumogastric nerves; and the phrenic nerves.

The process is very simple. It consists in pressing with the tip of the index finger, and with moderate force (just as one searches for painful spots in cases of neuralgia), upon the intercostal spaces in the whole of the precordial and pre-aortic region; also upon the sternum, and generally in those points of the thorax and neck in relation with these organs, the sensibility of which we desire to explore. In health, the cardiac muscle is insensible. Is it so in disease? Dr. Péter has satisfied himself that it is not; that in disease it suffers, and pressure upon it is painful. In acute and chronic myocarditis, patients complain spontaneously of painful sensations in the heart, which are too frequently disregarded, or misinterpreted and referred to intercostal neuralgia. But these pains are described as deep-seated, and they are aggravated by emotions or fatigue.

But, besides this spontaneous complaint of pain, pain may be excited in such cases by pressure. If we press with the tip of the finger, and with sufficient force, in succession, on the third, fourth, fifth, and even sixth left intercostal spaces, at first close to the sternum, and then more and more to the left of that bone as we descend—we shall not fail, in every case of myocarditis, to provoke tolerably acute pains. The greatest amount of pain is felt in the fourth and fifth spaces (sometimes, in cases of hypertrophy, in the sixth) corresponding with the situation of the ventricles, which are more commonly the seat of inflammation than the auricles. In some cases, pressure over the apex of the heart, which is very commonly the seat of degenerative changes, is alone painful. The pain produced by this pressure is sufficiently acute for the patient to start back or even to cry out.

These painful points differ from those of intercostal neuralgia, inasmuch as they are wholly *anterior*, whereas in neuralgia there are also two other painful spots—one lateral and the other posterior. In inveterate smokers beyond middle age, Dr. Péter has frequently found a tender spot, on pressure, in the third left intercostal space, near the sternum—a spot which, he thinks, corresponds with the auriculo-ventricular groove, and to the situation of the ganglion of Remak, which he concludes to be in a morbid state from impregnation with tobacco. Such persons complain of cardiac intermission, and of deep-seated pain which they refer to the spot indicated.

In disease of the aorta and its valves, there is often pain on pressure in the second left intercostal space, quite close to the sternum; this is not caused by the aortic lesion itself, but by a “propagated neuritis.” In exploring the sensibility of the nerves of the cardiac plexus, we must press gently, but with sufficient force, first in the third left intercostal space, then in the second, and then in the first; and from the second left space we pass to the adjacent portion of the ster-

num. If there be neuritis, there is pain on pressure, and the same is the case if there exists neuralgia of the plexus; and this should always make us suspect the existence of disease of the coats of the aorta.

By pursuing the same method, the sensibility of the pneumogastric may be explored. Having discovered the presence of a painful spot in the second left intercostal space, we may next find tenderness over the cervical portion of the nerve by compressing it just in front of the sterno-mastoid muscle; and then usually pain is felt either on the left side exclusively, or on both sides, but in that case it is always more intense on the left; and we may even find evidence of a degree of suffering by pressing over the apparent origin of the nerve in the nape of the neck, *i.e.*, over the second, third, and fourth cervical spines. It is necessary also to examine the sensibility of the phrenic nerves: this is done by pressing with the finger, successively, first, over the diaphragmatic attachment; second, over their course within the thorax along the borders of the sternum on both sides; and, third, in the neck over the attachment of the scalenus anticus to the first rib. We may thus find that both phrenics are painful, and that the left is more so than the right, and sometimes that the left is alone painful, or remains so after the right has ceased to be painful.

Dr. Péter considers this method of exploring the sensibility of the precordial and pre-aortic regions as of the highest importance, in the diagnosis of diseased states of the cardiac muscle and of the cardiac nerves. An important precaution in the case of any painful affection, as angina pectoris, is not to press too strongly with the tip of the finger. Dr. Péter has seen an attack of angina brought on by neglect of this precaution.—*London Med. Record*, May 15, 1881.

The Treatment of Splenic Tumours.

The inutility of internal remedies in advanced cases of splenic leucocythæmia led KUSSMAUL to try whether the spleen could not be made to shrink up by numerous punctures in different directions. The results are detailed in an inaugural dissertation by his pupil, J. Jäger. A hollow needle, at first a millimetre and afterwards a millimetre and a half in diameter, was thrust into the spleen of a patient aged thirty-eight, suffering from splenic leucocythæmia. The depth of the punctures was eleven centimetres. The hope was entertained that the hemorrhages into the substance of the spleen would lead to cicatricial contraction at the spot. The punctures caused the patient scarcely any suffering, but unfortunately the result on the spleen was also *nil*. There was a slight improvement in the course of some weeks, but this seemed attributable to the patient's rest. The spleen did not lessen in size, and the proportion of white to red corpuscles remained much as before the treatment—one white to seven or ten red. But an unexpected effect resulted from the deeper punctures—a considerable increase in the quantity of the urine, lasting for about a day, associated with strangury. The latter commenced an hour after the operation, and continued until the following morning. The specific gravity of the urine was lowered, but it was free from albumen and sugar. Senator has informed Kussmaul that he has also observed polyuria to follow puncture of the spleen. The explanation of the phenomenon is obscure. Kussmaul has also tried galvano-puncture of the spleen, but with no better results. After seven minutes' application the spleen was considerably swollen and painful, but subsequently again lessened in size. On the third application, four weeks after the first, the patient for the first time experienced severe pain in the sternum beneath the spot on which the positive pole had been placed; the patient attributed the pain to the electrode. So far, however, the treatment, if it did no good, did little harm. The same statement cannot be

said of the next measure employed, which is unfortunately a contribution to toxicology rather than to therapeutics. A gramme of a 10 per cent. solution of recently prepared sclerotic acid was injected into the spleen. Ten minutes later there was a severe rigor; the legs became rigid and intensely painful, the abdomen retracted, the extremities cold, the face cyanotic, the veins of the neck swollen, the breathing quick and purely costal, and the pupils dilated. Consciousness was unimpaired. The tetanoid attack lasted forty minutes. The temperature rose to 104° F. Abundant sweating followed, with vomiting and watery diarrhoea. The patient died a few hours later. The post mortem showed that, besides the enlargement of the spleen, the medulla of the bones was affected, but there was no disease of the glands. No trace could be found in the spleen of any effect of the punctures, and there were no adhesions of the organ to the abdominal wall. Death was apparently due to the rapid passage of the sclerotic acid into the blood, but Kussmaul is inclined to ascribe it rather to the rapid passage of the water containing the acid into the blood than to the acid itself. This was found by subsequent examination to be free from other toxic ingredients.

Mosler has tried the effect of injections of dilute carbolic acid and of Fowler's solution into a chronic splenic tumour. The result in Kussmaul's case led to careful precautions to avoid an untoward occurrence. Considerable benefit is said to have resulted from the treatment, although previous measures had been ineffectual.—*Lancet*, May 28, 1881.

Treatment of Diabetes Mellitus by Salts of Ammonia.

The treatment of diabetes mellitus with chloride or citrate of ammonia (recommended by Adamkiewicz, and said by him to reduce the sugar in one case as much as one ounce and four-fifths daily) has been repeated, but without satisfactory result (*Zetschr. für Klin. Med.*, Band i. Heft 3, p. 610), by GUTTMANN, in the case of a phthisical patient passing 6.4 per cent. of sugar in the urine. During the six days previous, the patient passed, on an average, 152 ounces of urine daily, containing 9 ounces of sugar; while during the five days that the ammonium chloride (two and a half drachms daily) was taken, the average daily amount of urine passed was 223 ounces, containing 14½ ounces of sugar; *i. e.*, 5½ ounces more sugar were excreted daily than before. In two further trials of five and three days each with the chloride and citrate of ammonia, the amount of sugar diminished only slightly—half to three-quarters of an ounce a day.—*British Med. Journal*, May 7, 1881.

SURGERY.

Langenbeck's Operation for Hare-lip.

Up to the present time WOLFF (*Arch. für Klin. Chir.*, Band xxv. p. 899) has made use of this method as an after-operation in adults, and in cases of incomplete hare-lip. The incision is commenced near the angle of the mouth, and is carried close above the margin of the lip (in this part very thick), it then mounts at the side of the fissure close above its upper limit (the border of the lip here being exceedingly narrow), from which point it is turned angularly downwards, carried along the side of the fissure and onwards almost to the other angle of the mouth. The two halves of the margin of the lip, joined in the centre by an exceedingly narrow bridge, now hang down in the shape of a long strip against the lower lip. The edges of the fissure are now approximated and united by two or three sutures put in from above downwards, and upon the basis thus formed

the margin of the lip is modelled. The broad lateral portions are drawn inwards, the narrow central portion being gathered up, and so arranged as to lie exactly in the median line, thus internally to the lower extremity of the closed fissure, which is situated on one side. A small coil-like projection, formed by the narrow bridge of margin of lip connecting the two lateral portions, now touches the lower lip exactly in the middle line. Finally, the margin of lip is sutured throughout to the upper lip in its new connection. Wolff alleges that his method possesses the following advantages: 1. A good symmetrical result, by reason of the normal arrangement of the margin of the lip, and the shifting of the sear to the meeting point of the white skin and red lip-border; 2. A good functional result, the whole circumference of the mouth being provided with closing muscular fibres; 3. Pure operative advantage, since here, as in Nélaton's operation, not a morsel of the border of the lip is removed. The difference between his operation and Nélaton's consists in the more extensive separation and sliding of the margin of the lip, together with the gathering up of the central portion.—*London Med. Record*, May 15, 1881.

Removal of Foreign Bodies from the Larynx.

In a paper published in the *Annales des Malad. de l'Oreille, du Larynx, etc.*, for Dec. 1880, Dr. KRISHABER considers the different methods of removing foreign bodies which have become lodged on a level with the glottis, describes four cases in point, and finally arrives at certain conclusions. The cases are very briefly as follows: Case 1 was that of a workman, aged 36, with a fifty-centime piece lying horizontally across the vocal cords, with its margins engaged in the ventricles of Morgagni. It was removed by forceps, under guidance of the mirror, but was accidentally swallowed immediately afterwards. Case 2. A fifty-centime piece lodged in a similar position in the larynx of a man, aged 35. Tracheotomy was performed, and the coin removed some days afterwards, in the following manner: The canula having been removed, the coin was pushed into the mouth by means of a large sound passed through the tracheal wound, whilst the patient was in the horizontal position. In case 3, a flat piece of bone, fixed in about the same situation, was removed with forceps *per vias naturales*. Case 4. A girl aged 9 years had a copper ornament (of the size and shape of a silver twenty-centime piece) lodged in the larynx on a level with the vocal cords. It was removed by the following method. The child being laid on its back across a bed with its head hanging over the edge, the surgeon knelt down in front of it, and passed his left forefinger into the larynx, whilst with the right hand he introduced a slender pair of laryngeal forceps, and extracted the foreign body. In regard to the removal of foreign bodies from this situation, the author distinguishes two varieties of substances: first, those stuck into the mucous membrane, such as pieces of bone, fish-bones, pins, etc.; and secondly, bodies which do not adhere to the laryngeal walls, as coins, nuts, etc. The former, he recommends, should be removed *per vias naturales* without previous operation; the latter also *per vias naturales*, but only after the trachea has been previously opened, and, if necessary, plugged, in order to prevent the foreign body from falling into the trachea or bronchi.—*London Med. Record*, April 15, 1881.

Local Anæsthesia of the Larynx.

Professor SCHROETTER, who has not been able to produce anæsthesia of the larynx to his satisfaction by the use of bromide of potassium, tannin, ether-spray, subcutaneous injections of morphia, carbolic acid, etc., now uses Türk's method in a modified form, which he describes in the *Allgemeine Wiener Med. Zeit.*,

March 15, 1881. The day before the operation the larynx of the patient is painted twelve times with pure chloroform, the object of which is to produce a hyperæmia of the mucous membrane, and so prepare it for the reception of the narcotic. This lasts from seven to nine minutes, and, as it causes a violent burning, is the most disagreeable part of the operation. After an hour, twelve paintings of concentrated solution of morphia (muriate of morphia, 1 part; distilled water, 10 parts) are applied, the patient being told to expectorate after each application, and to thoroughly cleanse his mouth and throat with a tannin gargle. He then sleeps, but must be watched during the night by the physician or other competent person, with proper antidotes (such as tea, coffee, etc.) in readiness. Dr. Schroetter has, however, found that, when the proceeding has been conducted with the above caution, there have not been any symptoms of poisoning, or, if any, but very slight. The larynx by eight o'clock the next morning has usually become so insensitve, that the operation may be at once proceeded with. Occasionally, the morphia application has to be repeated. Excellent as Dr. Schroetter considers this method to be, he does not make use of it often, for the reason that it is seldom necessary. For the removal of polypi, etc., a preliminary practice of introducing the sound a few times is sufficient. The painting with the chloroform is so disagreeable a proceeding, that he does not willingly resort to it. The importance, however, of being able to effectually produce local anæsthesia of the larynx is seen by the following case: A young man was brought into the hospital with a bone apparently lodged in the larynx. On laryngoscopic examination, a flat bone about 1 centimetre long could be seen during inspiration under the left vocal cord. On both sides of the bone, between it and the laryngeal wall, was a half-moon-shaped space, through which the patient only just audibly breathed. As the bone could not be removed by any other means, Dr. Schroetter tried to extract it with the forceps; but, owing to the sensitive condition of the parts, the instrument could not be introduced. Local anæsthesia was begun the same evening. The patient bore the paintings of chloroform better than usual, and, later on, the morphia solution was applied, the caution before alluded to being observed. The patient had no bad symptoms. In the morning, although the anæsthesia of the larynx was almost perfect, morphia was again applied by way of caution; and, by ten o'clock, the forceps could be introduced with the greatest ease, and the bone was extracted in two pieces. The following morning the anæsthesia was still present, but by evening had entirely disappeared.—*London Medical Record*, May 15, 1881.

A Second Case of Resection of the Stomach.

In a second case of resection of the stomach, performed by Dr. BILLROTH, unfortunately, the patient died on the eighth day after the operation, from inanition. Milk, coffee, soup, wine, and various forms of solid food, especially meat and biscuits, freely divided and in various combinations, were tried as food; but nothing remained longer than three or four hours in the stomach, being then vomited, mixed with gastric juice and tinged with bile. As symptoms of peritonitis were entirely absent, the vomiting could be traced only to mechanical obstruction to the passing of the contents of the stomach into the duodenum. At a meeting of the Vienna Medical Society, Dr. Billroth expressed the opinion that there must have been a kind of bend in the passage from the stomach to the duodenum, by which the transit of the food was made difficult. Another important fact noted was that the stomach, having been previously much dilated, would scarcely have sufficient power of contraction to overcome this obstruction. The action of the stomach was also considerably impeded by peritoneal adhesions to

surrounding parts, especially the abdominal wall. These considerations induced Dr. Billroth to reopen the wound six days after the operation, in order either to remove an existing mechanical obstruction, or to form a duodenal fistula, through which the patient might be temporarily fed. Dr. Billroth opened the stomach for the second time, under anæsthetics, and found it very much dilated and fixed, not only within the sphere of the former operation, but also higher up towards the diaphragm. The passage into the duodenum was free, but bent. As a fresh and complete suture of the stomach would have taken too much time, and, moreover, was not advisable in the lowered state of vitality of the patient, the abdominal wall was fixed to the opening in the stomach by a few sutures; and a drainage-tube, about the size of a finger, was placed in the duodenum for the introduction of food. This arrangement answered well; but the patient, who, since the operation, had been nourished only by enemata, was past recovery, and died from exhaustion thirty hours after the second operation. The necropsy confirmed the observations made during life. Signs of general peritonitis were entirely absent. This second case, as well as the first, teaches that the operation of resection of the stomach carries with it as little danger of general peritonitis as any other laparotomy, carried out under strict antiseptic precautions, without spray. It appeared further, from the necropsy, that the extirpation of the cancer was complete. The mesenteric glands were intact. With respect to the mechanical cause of death, this case is prospectively instructive, especially in cases where the stomach is dilated. These first two cases of Dr. Billroth have made a beginning in this serious operation; but much labour and experience will be necessary until recovery can be expected after resection of the stomach, as quickly and with as little anxiety as after ovariectomy. The first patient operated on by resection of the stomach is at the present time in perfect health.—*British Med. Journal*, April 23, 1881.

Gastrostomy and Duodenostomy.

Dr. CARL LANGENBUCH has sent to our contemporary, the *Berliner Klinische Wochenschrift*, an interesting contribution on the above subjects. He first refers to a recent case of gastrostomy performed and reported on by Dr. P. Kraske, of Halle, in which death took place from an "artificial perforative peritonitis," brought about by an escape of the gastric contents, and then relates three cases in which he had himself operated. His own cases may be briefly summarized as follows: A child, one hundred and seventy-three days old, who had swallowed some caustic solution. This part of the operation was performed with full Listerian precautions. The stomach itself was opened fourteen days later; a very small opening was made into it, and a drainage-tube with stopcock was inserted. This fitted so accurately that none of the acid contents of the stomach ever escaped to irritate the edges of the wound or the adjacent skin. The incision commenced in the middle line, and followed the arch of the rib cartilages towards the left side as far as the eighth cartilage. The tissues of the abdominal wall were divided layer by layer; the peritoneum was opened on a director, and its free margins were seized by forceps to prevent retraction. A portion of the stomach at once presented, and a small portion of the left lobe of the liver became visible. The stomach was next attached to the abdominal walls by fifteen fine silk sutures arranged in an oval fashion; they included only the peritoneal and muscular layers of the stomach. The earliest attempts at feeding caused some little discomfort; but this soon passed off, and the child began to gain weight. A feeling of thirst was almost constant. Two hundred and ten days after the operation the child contracted a severe catarrhal pneumonia, and died. The adhesion between the stomach and the abdominal walls was quite firm. The second

case was that of a woman aged sixty, with cancer of the lower part of the œsophagus. A similar operation to the one just detailed was performed; but the patient, who was exceedingly low at the time of the operation, died two days later. Although so short a time had elapsed, it was found at the post-mortem examination that the stomach was already firmly adherent to the abdominal wall; there was no peritonitis whatever. The third case was one of duodenostomy: a woman aged thirty-two years, who had had stomach-troubles for several years. In the neighbourhood of the pylorus a well-marked tumour was appreciable, which could be followed along the lesser curvature of the stomach. The pylorus seemed to be entirely occluded, as there was constant vomiting of the food, and scarcely any feces were passed. The operation was intended to be exploratory: if feasible, the pylorus was to be excised; if not, then an opening was to be made into the duodenum—and this, in fact, was done, for it was found that the cancerous disease had spread along the lesser curvature of the stomach, and that resection of the pylorus was therefore quite impossible. A piece of the first portion of the duodenum was attached to the abdominal wall by fifteen to twenty fine sutures, which did not quite penetrate the entire thickness of the duodenum. The gut was opened seven days after the first operation, which was performed with all Listerian precautions. The patient, however, died ten days later of inanition.

The author, in commenting on these operations in general, divides them into two groups of cases—those in which the object of the operation is attained, and those in which it is not attained. Taking the last group first, these cases are again subdivided into such as die directly from the effects of the operation before the opening has been established—of acute septic peritonitis, for instance, or from some intercurrent causes, such as pneumonia or metastases. The first group is also subdivided (1) into cases which are successful as surgical operations, but in which the life of the patient is not materially prolonged; and (2) into cases which are completely successful.

Death from septic peritonitis in the present stage of surgical knowledge ought not, he thinks, to occur, unless the teachings of antiseptic surgery go unheeded. He says, too, that the antiseptic dressing must be most carefully carried out; “a partial antiseptis is about as good as none at all.” The sutures ought not to penetrate through the mucous membrane of the stomach, as the openings may possibly become enlarged by the constant peristaltic movements which take place, and thus give passage to some food or other material into the general peritoneal cavity. Great care should be exercised in adapting the stomach to the wound, in order to avoid traction as much as possible, and as many sutures as can reasonably be used should be inserted in order to gain the greatest amount of adaptation to the abdominal walls. The silk should be soft and well carbolized; it may pass for a quarter of an inch beneath the muscular tissue, and the included oval of gastric tissue should not be too small. If the stomach does not seem firmly attached, one single thread might be passed through the centre of the oval into the stomach, and after passing out again might be tied over a roll of carbolized gauze placed on the outside. In this way the stomach may be well and firmly attached to the abdominal wall, and with little or no danger of extraneous matters getting into the peritoneal cavity, or of being displaced by any sudden fit of coughing.

As regards the immediate opening of the stomach, the author rejects the plan as very unsafe. If there is urgency, he would suggest the use of an aspirator syringe, and inject liquid food in this manner. It is in cases of carcinoma that there is usually much vital depression, depending rather on the dyscrasia than on inanition proper; and it would seem as if a carcinomatous stomach, once out of

working order, re-takes on with difficulty its digestive functions. Hence the necessity for a comparatively early operation, if surgeons would be successful in this form of disease. By waiting until the patient is nearly exhausted, it is not possible to allow a sufficiently long interval after the operation to elapse before opening the stomach. Langenbuch thinks that as soon as the difficulties of swallowing are at all pronounced, the first part of the operation should be undertaken, and that the surgeon ought not to wait until the œsophagus is quite impermeable. As regards the second part of the proceeding, he especially recommends but a very small opening into the stomach—so small, indeed, that a certain amount of force is required to get in the tube. The tube should be provided with a stop-cock; and thus all escape is prevented. Before the stomach is punctured, it is desirable to fix it with a sharp hook, in order to prevent any possibility of inadvertently puncturing its posterior wall at the same time.—*Med. Times and Gaz.*, May 14, 1881.

Intestinal Resection.

Professor CZERNY communicates (*Berl. Klin. Woch.*, No. 45, 1880) three cases of intestinal resection which he has performed. In two cases, the gangrenous coil of intestine in a strangulated hernia was resected; and, in the third case, a malignant tumour of the colon was removed. In one of the first two cases, the patient recovered perfectly without fever or reaction of any sort; in the second, the already pulseless patient died during the operation in a fit of fecal vomiting. The third case was the most remarkable. A female, 47 years old, with a tumour in the abdomen, diagnosed as intestinal cancer, had vomitings and diarrhœa. On operation, there was found a large tumour of the transverse colon, firmly attached to a coil of the sigmoid flexure. Part of the sigmoid flexure was first resected, the ends being brought together with thirty-three sutures; then a large piece of the colon was removed, and the ends united by twenty-six sutures. Lastly, a wedge-shaped piece of the meso-colon was removed, also necessitating ligatures. A drainage-tube was inserted, and the wound in the abdominal wall closed by means of four deep and eight superficial sutures. The patient recovered, and was living half a year after the operation, although, from the infiltration of the mesenteric glands, a recurrence is inevitable. Dr. Czerny proceeds as follows. The intestine being compressed above and below, the diseased part is removed along with the corresponding wedge of the mesentery. The ends are now disinfected, and a double row of carbolized silk sutures applied. Those in the first row include about a twelfth of an inch of the serous and muscular layers of each end of the intestine, and are about a twelfth of an inch apart. A second row of sutures, about a fifth of an inch apart, are applied over and partly including the first. The intestine is then returned into the abdomen, and antiseptic dressing applied.—*London Med. Record*, April 15, 1881.

Resection of about six and a half feet of the Small Intestine, with Recovery.

Dr. KOEBERLÉ, of Strasbourg, reports in the *Gazette Hebdomadaire*, Nos. 4, 5, 1881, the following remarkable case. Miss K., aged twenty-two, never had any disease nor indispositions, except colics, of which she has suffered at different times for the last two or three years. These had returned more severe and more frequent last year, and in October (1880), severe symptoms of intestinal strangulation recurred twice, fifteen days apart. These were relieved in both circumstances by clysters. Ever since, she suffered with continuous and intense colics, which gave her no rest, day or night, and which could hardly be subdued by hypodermics of morphia. Three points of intestinal obstruction

could be inferred from the successive colics, but a positive diagnosis of the lesions could not be made.

Dr. Koeberlé performed gastrotomy, November 27. There were four narrowings more and more marked, the last being hardly .004 m. ($\frac{1}{8}$ in.). The first two were .14 m. ($5\frac{1}{2}$ in.) distant. These strictures involved two metres ($6\frac{1}{2}$ ft.) of the small intestine, all of which were amputated between two ligatures at each end, and twelve ligatures were applied to the mesenteric vessels. The ligatures from the two free ends of the intestine were tied together in such a manner as to lay the sides opposite to the mesentery in apposition, the most favourable condition for enterectomy, and they were attached to the fibrous tissue of the *linea alba* through a suture which retained them in contact with the peritoneum at the inferior angle of the incision. The ligatures of the mesentery were brought out at the superior angle of the abdominal incision, where they were retained; together with the ligatures of the intestine, in a fixed position. The superior part of the wound was partially closed. Enterotomy was made the third day. The ligatures and sloughs came off from the twelfth to the fifteenth day. First alvine discharge took place after twenty days. On the twenty-fifth day the communication with the intestine was almost closed, and six weeks after the operation, the external wound was also closed and healed. The patient is feeling quite well, and experiences no digestive disturbance.

The temperature rose above 38° C. ($100\frac{2}{3}^{\circ}$ F.) once on the third day. The operation lasted more than three hours, and was not made antiseptically. The peritoneal cavity was simply cleaned by towels which imbibed the serum as low down as the pelvic cavity. Patient was fed, after the second day, with solid substantial aliments (bread, meat and eggs), with an amount of liquid strictly sufficient to insure digestion. Drink was administered by rectal injections. She took thus, in the space of twenty days, seventy injections of pure water which were all retained.

Conclusions from this and similar operations:

1. Resection of the small intestine can be made for a considerably long portion, two, and even more, metres, without disturbing the digestive system in any appreciable manner.

2. Made under favourable conditions, this may be considered a perfectly appropriate operation.

3. Resection can be made: 1. Either by a direct operation, sewing the two ends together, and immediately closing the external wound; 2. Or by making an incomplete apposition by sutures of the ends of the intestine, combined with an artificial anus. The second and the third are the safest procedures.

4. Resection of fibrous or cicatricial strictures, which are probably more common than we are aware, is likely to be followed by a permanent recovery. So also the resection of epitheliomas. On the contrary, resection for cancerous obstructions gives but a temporary relief, more or less marked, on account of the return of the affection, its metastasis, and the progressive degenerations of the lymphatics.

5. Keeping the intestine closed after the operation, as I did in this case, exempts the patient from any alvine discharge for many days, until the adhesions are sufficiently strong. On the other hand, the abdomen remains a little distended, thus preventing the entrance of air or of septic liquids into the peritoneal cavity. Feeding the patient on solid food reduces the feces to their minimum, and leaves no depressing result.

6. Clysters relieve the thirst, diminish the fluids in the small intestine, and free the patient from much annoyance.—*Chicago Med. Journal*, April, 1881.

Nephrectomy by Lumbar Section.

At a late meeting of the Royal Medical and Chirurgical Society (*Lancet*, April 23, 1881) Mr. ARTHUR E. BARKER read a paper the basis of which was a record of two cases in which he had recently performed nephrectomy by lumbar section for calculous pyelitis. But before considering them in detail, a brief review is given of the whole question of excision of the kidney in the light of all those cases he has been able to collect. Referring to a paper published in last year's Transactions of this Society, in which he tabulated 28 cases of this operation, he points out that of this number 14 recovered and 14 died; but that, deducting those 6 cases in which the operation was performed upon a wrong diagnosis or undesignedly, there remained 13 recoveries and 9 deaths. Passing on then to the new collection, 26 in number, he shows that 12 recovered and 14 died in the gross; or, making the same deduction as above (of 5 cases) that 11 recovered and 10 died out of the remaining 21. Adding the latter to the 22 designed nephrectomies of last year's table, he finds that, out of the resulting 43, recovery took place in 24 and 19 died. Two recoveries where nephrectomy was not premeditated might further be added to these 24. The causes of death in the 28 fatal cases of the combined tables are shown to be as follows: Peritonitis, 8; shock and collapse, 5; pyæmia, 2; uræmia, 2 (in one of these the other kidney had been destroyed by old disease; in the second it as well as the liver was found in a state of advanced fatty degeneration); wound of pleura, with consequent collapse of lung, 1; pulmonary thrombosis, 1; hemorrhage during operation, 1; after operation, 2; exhaustion of vomiting, 1; œdema of lungs, with marked dyspnœa, 1; exhaustion from suppuration, 1; unrecorded, 3. Of the 9 fatal cases out of these 28 where nephrectomy was unpremeditated, 4 died of peritonitis; 1 of hemorrhage during, and 1 after operation; 1 of suppuration and exhaustion; 1 of œdema of the lungs with marked dyspnœa; and in 1 the cause is not recorded. Of the two modes of operation—i. e., in the lumbar region and in the linea alba—the first shows the largest proportion of recoveries, but the author regards the mere numerical analysis of the cases as liable to mislead on this point in view of the varying nature of the conditions for which the operation was undertaken. A careful perusal of all the original records is alone to be relied upon for estimating the two methods correctly.

The histories now recorded are briefly as follows: A married woman, aged thirty-two, was admitted into University College Hospital on June 16th, 1880, on account of a rapidly growing tumour in the left abdomen, first noticed seven weeks before, and accompanied by pain and much lassitude; the pain had existed since patient was five years of age. The tumour on admission measured 14 by 4½ inches, was smooth, and fluctuated obscurely. Diagnosis: Pyonephrosis probably due to calculus. On July the 2d the tumour was aspirated from behind and 18 oz. of fetid pus withdrawn. The next day it had refilled. Nephrectomy was performed on July 5th through an incision made downwards and forwards from midway between the last rib and crest of ilium for four inches. The enormously thickened capsule of the kidney was soon reached, and its removal with the contained kidney attempted. After a considerable loss of time and blood from the vascular and inflamed tissue this line of action had to be abandoned on account of the extremely wide-reaching attachments of this mass of fibrous investing material. The organ itself was then sought for and was easily shelled out of its capsule with the finger and without loss of blood. The pedicle was tied with silk, not without difficulty, and the organ was cut away, after which some twigs spouted and had to be ligatured separately. The whole operation was conducted under Listerian antiseptics and lasted one hour and ten minutes.

The patient died three hours after its completion, of shock. The autopsy showed that it would have been next to impossible to have removed the capsular structures with the organ. They now lay as a great hollow mass of fibrous tissue attached to the spine. Enucleation of the organ alone ought to have been aimed at from the beginning. No bleeding had occurred after the operation, and the peritoneum was not torn.

The next case is that of a woman, aged thirty-eight, to whom an operation for calculous pyonephrosis had been proposed seven months before and refused. The kidney was not at that time much enlarged, though a large stone was found in it by means of an aspirator needle. Six months later the patient requested the author to readmit her into hospital and perform any operation for her relief he might deem advisable, as she had suffered very severely in the interval, and was losing ground. On readmission she was very emaciated and bedridden on account of pain, the slightest movement even in bed causing much distress. On Oct. 5th an operation was undertaken with a view to remove the stone if possible, and if not, of excising the kidney containing it. An incision was made from the middle of the twelfth rib downwards and forwards for five inches, and the kidney rapidly exposed. An aspirator needle was then thrust into the organ and the stone struck, about two ounces of pus being withdrawn. A vertical incision was now made down to the calculus with a Paquelin's cautery knife through the cortex of the organ. The stone was very firmly fixed, and, when drawn on with a forceps, broke, one-half only coming away. Very great difficulty being apprehended in removing the remaining half, the excision of the whole organ was determined on. Warned by the last case, the surface of the kidney itself was sought for at once as a guide to enucleation, which was consequently easy. The difficulties of clearing the pedicle, however, were insurmountable in this case, and after many attempts to clear it, it was ligatured *en masse*, the ligature including much of the kidney tissue. It was not, however, possible to draw the silk close enough to justify cutting away the organ, which was therefore left *in situ*. In clearing the lower ends of the organ, something was felt to give way at one spot, to which it was firmly adherent, and it was suspected that the colon had been torn. The operation was completed by a Listerian dressing, having lasted one hour and twenty minutes. The patient died twelve hours later of shock. After death it was seen that the pedicle could not have been cleared, even though the last rib had been resected, which was now done for experiment, with ease and without any damage to the pleura. Also that any endeavour to remove the organ with its investing structures would have ended in failure, owing to the very extensive attachments of the latter. The colon was found to have adhered to the kidney and to have been torn at this spot, where it was soft and sloughy.

The first point brought out by these operations appears to be the necessity of removing the kidney and it alone in such cases, and of not attempting to take away the investing structures with it. Again, the desirability of early operation, before the parts around the organ, and especially the pedicle, have become converted into a mass of dense inflammatory tissue. Thirdly, the want of every kind of data bearing on this operation, and either encouraging or discouraging its performance.

Mr. CLEMENT LUCAS, agreeing with the author's view as to the publication of unsuccessful cases, had not yet published a case of his own, in which fourteen months ago he had performed the operation with good result. The patient had been bedridden for three months with a sinus in the loin; the operation was difficult owing to adhesions, and severe secondary hemorrhage set in two weeks afterwards, only checked by plugging the wound with sponges soaked in perchloride

of iron. He saw the patient a month ago; the wound was healed and he had gained much flesh. In that case pus did not disappear from the urine for many weeks after the removal of the kidney, showing that much pus must come from the bladder and ureter. He thought the lumbar operation preferable to the ventral, except in some cases of tumour, and he advocated a vertical incision from the last rib, and another passing horizontally outwards to the quadratus lumborum. Mr. Marrant Baker in a recent case made a transverse incision, enlarging the wound in a vertical direction. He agreed with Mr. Barker as to the impossibility of removing the capsule with the kidney. In his own case no sign of uræmia, and no vomiting followed.

Mr. MORRANT BAKER felt strongly the importance of removing the kidney without the capsule. In his recent case (a child eight years old), nephrotomy was first performed, and finding that the removal of the kidney would be easy he determined to do this if necessary. But when he came to perform nephrectomy, two or three months later, the capsule had become so thickened that he was obliged to detach it. This was done without much hemorrhage, no difficulty was met with as regards the pedicle, and the case did well. Apart from the risks of the operation itself, the removal of one kidney does not appear to have much influence. The child had fairly recovered from the effects of the operation in twenty-four hours, and no ill-results ensued.

Mr. BARWELL had a case where death ensued shortly after operation. The patient was weakly, and passed much pus in the urine. He made a free incision into the abscess, evacuating much pus, and felt the kidney lying in the sac. The removal of the organ was easily effected, but it had to be detached from the crus of the diaphragm. A ligature was passed round the vessels and ureter, and the kidney then removed. The difficulty was to decide upon suitable cases, and to determine whether they could be dealt with by lumbar incision. He advocated free incision rather than aspiration in dealing with the perinephritic sac in the first instance, for the kidney could then be felt. The incision could be the same as for lumbar colotomy, and antiseptic precautions should be used. In a case of perinephritic abscess under the care of Dr. Silver, Mr. Barwell made a free incision in preference to aspiration, let out thirty-five ounces of pus, felt the kidney, which seemed healthy, inserted a drainage-tube, and the case recovered. The case of nephrectomy to which he had referred proved fatal on the fifth day, the patient dying comatose apparently from uræmia. The other kidney was found to be also the seat of tuberculous disease, so that had the operation been earlier performed the result might have been different.

Mr. BARKER, in reply, was glad that Mr. Baker had confirmed his view upon the desirability of removing the kidney from the capsule. Mr. Barwell's suggestion of an exploratory free incision was a good one. In a case of suspected tubercular disease he had preferred such exploration to excision, and evacuated much pus with considerable benefit. The patient survived two months, and after death both kidneys were found to be tubercular. In nephrectomy the time at which the ligatures come away from the pedicle, when this is tied *en masse*, is often much delayed, sometimes after the space of many months.

Excision of the Hip-Joint in Children.

At a late meeting of the Clinical Society of London (*Lancet*, May 21, 1881) Mr. HOWARD MARSH presented the Report of the Committee appointed to inquire into the value of excision as a means of treating disease of the hip-joint in childhood, of which the following is an abstract. The points specially investigated were: 1. The indications for the operation; 2, its results; 3, the method of operating; and 4, the nature of the disease.

In 45 cases treated by excision there was a total mortality of 35.5 per cent. from causes connected with the disease; 13.4 per cent. from some form of tubercular disease; the average duration of treatment was $1\frac{3}{4}$ years; the average shortening amounted to $2\frac{3}{4}$ in., while the movement at the hip was free, limited, or *nil* in the proportion of 11, 6, and 3. In 260 cases of suppuration treated without excision, there was a mortality of 30.4 per cent. counted as above, 9.2 per cent. from tubercular disease, an average period of treatment of $2\frac{1}{2}$ years, with an average shortening in 33 cases of 1.6 in., and in 35 of the cases 30 walked with slight or no limp, 5 with considerable limp; the movement was free, limited, or *nil* in the proportion of 5, $4\frac{1}{2}$, and 3. In 124 cases without suppuration the total mortality was 10.5 per cent., 7 per cent. from tubercular disease, and the movement was free, limited, or *nil* in the proportion of 5, 3, 3; in 17 of these cases the average shortening was 1.4 in., and in 1 there was apparent lengthening of $\frac{3}{4}$ in.; of 22 of them 19 walked well, and 3 limped. Sequestra were found in 59 per cent. of the specimens of the disease examined. Of a total of 203 cases of excision collected from various sources 13.7 per cent. died directly from the operation.

The pathological indications for the operation are stated to be necrosis of head of femur, or formation of large sequestra, extensive caries of the bones, intra-pelvic abscess from acetabular disease, and long-continued suppuration. The clinical indications are—rapid onset of suppuration, with severe local and constitutional symptoms, general albuminoid disease and long-continued suppuration in spite of other treatment. Pelvic disease is no bar to the operation. The mortality from tubercular meningitis, in cases of excision, was 4.4 per cent., in other cases of suppuration 6.1 per cent., in cases without suppuration 5.6 per cent. Of 429 cases 9 per cent. died from some form of tubercular disease. The limb is more generally less useful after excision than other modes of careful treatment. Only the diseased bone should be removed, and the great trochanter only when diseased or when there is extensive disease of the pelvis. While the occurrence of necrosis is shown to be proportionately very large, clinical records show that, in many instances, these sequestra are small, and either come away by themselves or are very easily removed in general operations.

Transplantation of Bone.

At the last meeting of the Royal Society, Dr. MACEWEN presented a paper on a case in which he had successfully transplanted bone. The patient was a child four years of age, who had lost two-thirds of the shaft of the humerus by necrosis fifteen months previously, and in whom no osseous repair had occurred. The limb was of course useless. Dr. MacEwen proceeded first to make a groove in the soft tissues in the position of the bone, relying for this on his anatomical knowledge, and then placed in this groove small fragments of wedges of bone removed from other patients for curved tibiae. The result has been that a good new bone has been formed, the new portion has united firmly to the upper epiphysis and lower part of the original shaft, and the bone is only half an inch shorter than its fellow. Proper care was taken throughout to have the parts perfectly aseptic. Great interest attaches to this case, which is the first of the kind recorded, and Dr. MacEwen is entitled to warm praise for devising and carrying to such a successful issue the many details necessarily involved in its management. Happily Nature is usually so skilful in the repair of lost parts of bones, that it is not often the surgeon is called upon to make good the loss; but much as there is to marvel at the way in which Nature thus generally plays her part, cases now and then occur in which she fails to supply the lacking portion. Many interesting problems arise in reviewing the facts of this case. The first is,

What was the original condition of the limb? There was evidently a local inability to produce a new bone, and we may presume that in the primary inflammation the periosteum, or at least the deeper active portion of it around the sequestrum, had been destroyed, and the lymph poured out from the surrounding tissues lacked any "ossific stimulus." This the bone-grafts supplied. But how are we to explain the formation of new bone of the proper length and form? We cannot, of course, attribute this power to the transplanted tissue; it might have seemed probable if Dr. MacEwen had used pieces of the opposite humerus, or even any humerus, for his purpose; but we find that pieces of tibia were successful. If not the transplanted bone, are we to say that the ends of the original bone exerted a moulding influence on the ossifying material, or was it the effect of the surrounding tissues? A question naturally arises whether transplantation of bone is essentially better than transplantation of periosteum alone. It is easy to see that when whole pieces of bone are used, the periosteum over them will be probably more active than when stripped off and used alone, as in stripping off it is liable to injury. It would also be exceedingly interesting to know what actually became of the transplanted bone. Did the medullary cells and soft parts live, and the fragments become actually incorporated with the new bone; or was lymph effused around and into the bone, which was then gradually softened down and absorbed, or cast away in secretion? The problem is the same as has been raised about organizing blood-clot. A case published in our columns in 1878 by Dr. MacEwen may be taken as throwing some light on the question; there, in a case of compound fracture of the leg, a fragment two inches and a half long was completely detached, except by a very few slender bridges of periosteum, but being replaced and carefully treated, it was seen after four weeks to become injected with blood, and granulations rose from its surface. Here the whole process was closely watched from day to day, and the large fragment was seen to become firmly incorporated again with the rest of the bone. Other cases, individually perhaps less conclusive, point to the same conclusion; we may refer to one contributed to our columns in 1877 by Mr. Porteous. As so frequently happens in such cases, while Dr. MacEwen has been carrying the case to a successful issue in Glasgow, a similar proceeding had been determined upon by Mr. C. Macnamara of the Westminster Hospital. On Wednesday last we saw him plant several small fragments of bone taken from an amputated metatarsus in a groove prepared in the leg of a little child from whom several months ago he had removed the greater part of the shaft of the tibia. This operation was determined upon and discussed before the class of students more than a month ago, before Dr. MacEwen's case was made public, but it was postponed until the patient had had a few weeks' change of air in the country. Mr. Macnamara remarked, in reference to it, that he had been greatly struck with what he had seen in the practice of Mr. Thompson, who has removed teeth and replaced them several hours later, and they have adhered firmly in a few days; this, with other facts, had encouraged him in his endeavour to make a new bone in the case in point.—*Lancet*, May 28, 1881.

OPHTHALMOLOGY AND OTOTOLOGY.

New Method of Blepharoplasty.

Dr. LANDOLT (*Archives d'Ophthalmologie*, Dec. 1880) describes a new operation of blepharoplasty, from which he has obtained good results. For this operation, the eyelids may be considered as formed of two layers superposed, the external consisting of skin and orbicularis, with the eyelashes, the internal of

submuscular connective tissue, venous plexuses, tarsal cartilage, and conjunctiva. When these layers are separated in the plane of the forehead, two raw surfaces of considerable extent are obtained, between which a flap, freshened, and from the opposing lid, can be inserted. The upper lid is extremely elastic, and can be drawn down and fixed to the edge of the lower by points of suture. The eye is thus hermetically sealed up, but, after a sufficient time has elapsed, the lid can be cut across, and the palpebral aperture restored. It remains then merely to cover the abraded edges with conjunctiva. Dr. Landolt adds that the operation is indicated chiefly in cases of loss of one lid when its fellow is intact or but little damaged, and in cases in which the two lids are each partially destroyed.—*London Medical Record*, April 15, 1881.

Colour-Blindness.

A valuable contribution to our knowledge of colour-blindness has been made by Dr. de FONTENAY, of Copenhagen, who has published the result of his researches in the *Nordiskt Mediciniskt Arkiv* for 1880. He follows the classification proposed by Holmgren: 1. Total colour-blindness; 2. Partial colour-blindness; (a) complete blindness of red, green, or violet; (b) incomplete colour-blindness; (c) feeble sense of colour. The last is not Daltonism, properly so called, and is omitted in the statistics. The examinations were made by means of Holmgren's coloured wools; and in some of the cases, in which colour-blindness was detected, the results were controlled by various additional tests.

The total number of persons examined by Dr. de Fontenay was 9659, of all ages from eight years upwards; 6945 being above the age of sixteen, and 2714 below that age. Of the whole number, 217, or 2.25 per cent., were colour-blind. Of 4492 adult males, 165, or 3.7 per cent., had colour-blindness. Among these, 1001 belonged to the upper classes, and showed a percentage of 3.09; while in 3491 artisans, labourers, etc., the percentage was 3.87. The percentages of colour-blindness varied greatly with the employment of the individual: thus of 2737 railway officials, 3 per cent. were colour-blind; of 183 post-office officials, 9.28 per cent.; of 930 artisans of various kinds, 3.22 per cent. It is not certain how far these proportions are accidental, or how far the greater prevalence of colour-blindness in the lower orders may be due to defective cultivation of the sense of colour, or to heredity. In any case, Dr. de Fontenay's observations agree with those of Holmgren, Magnus, and others. In order to render his results as exact as possible, Dr. de Fontenay did not confine his researches to a single part of Denmark, but extended them over the whole country.

Of 6,945 adults above the age of sixteen (4492 males and 2453 females), 176, or 2.56 per cent., were colour-blind. Among the females, there were only 11 cases of colour-blindness, or 0.45 per cent. Adding to these the female children who were examined, a total is obtained of 3819, among whom there were 16 colour-blind individuals, or 0.42 per cent.; while, in a total of 5840 male (adults and children), the number of cases of Daltonism was 201, or 3.44 per cent. All the sixteen colour-blind females belonged to the working classes. Among the 2714 children, aged from eight to sixteen, 41, or 1.51 per cent., were colour-blind—viz., 1348 boys, with 36 cases of Daltonism, or 2.67 per cent.; and 1366 girls, with 5 colour-blind, or 0.37 per cent.

Two cases of violet-blindness, which were incompletely examined, being excluded, there were found to be 56 cases of red-blindness, 24 of green-blindness, and 135 of incomplete colour-blindness. In all the cases, both eyes were examined separately, and found to be affected. As regards the relation between the colour of the eyes and colour-blindness, Dr. de Fontenay does not find any special predominance of colour-blindness in dark or in fair individuals.

With regard to hereditary transmission, exact information was obtained in 34 cases, in 27 of which heredity was denied. In two of the cases, the fathers were colour-blind in the same way as the subjects examined. The parents of another had normal vision; but a paternal uncle, two brothers, and the son of the person examined were colour-blind. In the parents and grandparents, and the son, of another person, the colour-sense was normal; but his brother and three maternal uncles had colour-blindness. In another case, the perception of colours was normal in the father, mother, brothers, and sisters; but the maternal grandfather, a maternal cousin (male), and the son of a female cousin on the mother's side, were the subjects of Daltonism. Another of the colour-blind persons had four relatives who were similarly affected; a maternal uncle and cousin, his mother's grandfather, and a brother. There was no instance of consanguineous marriage among Dr. de Fontenay's cases of colour-blindness.

The original paper contains a table of the 217 cases of colour-blindness, in which particulars are given as to the age, the colour of the eyes, the question of heredity, the result of examination with Holmgren's test, and also with other methods when employed, and the diagnosis. The author shows an extensive acquaintance with the literature of the subject; and quotes frequently, for the purpose of illustration and comparison, from the writings of Holmgren, Gladstone, Magnus, Cohn, Joy Jeffries, Wolfe, and others who have investigated it. He says that the increased attention paid to colour-blindness, within the last few years, has been attended in Denmark with some important results. All the *employés* of the public (State) and private railways have been examined, in order to ascertain their sense of colour (except in the case of one private company, which did not think such an examination necessary); and henceforth all candidates for situations on railways are to be tested as to their perception of colour. No law on the subject, however, has as yet been enacted; nor has any regulation been made with regard to the navy and mercantile marine, beyond obliging candidates for admission to the school of naval officers to submit to an examination.

Herr E. J. Mellberg, principal teacher of physics in the Lyceum at Helsingfors, has also examined the colour-sense of 227 pupils in that institution. Among them, he found ten cases of Daltonism, or 4.4 per cent.; four of red-blindness, one of green-blindness, two of violet-blindness, and three of incomplete colour-blindness. In addition, among the boys whose sense of colour is stated to be normal, there were three who confounded light yellowish-red with rose-colour; eighteen who could not distinguish between bluish-green and pure green; fourteen who failed in both these respects; and nine in whom the perception of colours was weak. The ages of the subjects varied from nine to twenty; and only one case of colour-blindness was met with in three above the age of seventeen.

The theory of Young and Helmholtz is regarded by Herr Mellberg as incapable of explaining, completely, either normal vision or colour-blindness. In his opinion, the eye possesses separate organs of perception—not only for three or four different colours, but for all the shades which can be distinguished; and colour-blindness, properly so-called, consists of incapability to receive the impression of a shade of colour, and is not necessarily connected with the impossibility of distinguishing between the impression received and the other colours of the spectrum.—*British Med. Journal*, April 30, 1881.

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On the Diseases of the Ear in Locomotive Engineers and Firemen which may endanger the Travelling Public.

During the last few years Dr. Moos has been consulted for diseases of the ear by four locomotive engineers who had already resigned their posts for other reasons. These cases had this in common, that all four dated the origin of their

deafness to the time when they still pursued their calling, that both ears were affected, and that the hearing was greatly diminished. Two of them suffered from constant subjective noises in both ears, one in one ear only, while the fourth heard no subjective noises at all. All four cases could be classified under the heading of *the sclerotic form* of catarrh of the middle ear. This fact led Professor Moos to turn particular attention to the subject in question, *especially as similar observations which he has since made in the case of locomotive engineers and firemen who were still on active duty had brought so vividly before him the danger which these affections might cause to the travelling public.*

After describing several cases which have come under his observation, as well as quoting the remarks of several authors who have drawn special attention to the danger to the travelling public from the affections of the ears of engine-drivers and stokers, he goes on to state that it is "now nearly thirty years since the French railroad surgeons began to pay more particular attention to the health of the employés," and that there is a defect in the German law with regard to the reporting of all cases of deafness to the superintendent of the line. It is not binding enough on the railway surgeons. Government or private railroad corporations should keep their own interests in view in the appointment of surgeons for these examinations. They would be acting for their own advantage in preferring one who has made a special study of ophthalmology and otology. The multiplicity of positions on railroads gives numerous chances for employing deaf men otherwise than in the positions in which their hearing became affected; but even a discharge from active duty on full pension amounts to nothing in comparison with the damages for goods and loss of life which depend on deafness for signals. Think also of the enormous sums often paid for damages in cases of accidents.

As regards the frequency of the deafness, Dr. Moos gives the expression of one engineer while undergoing repeated tests of his hearing: "If all of my fellow-engineers were tested as I have been, more than one-third of them would be found deficient in hearing." If affections of the ear in engineers and firemen are not so frequent as in others exposed to similar noxious influences, *e. g.*, hunters, foresters, machinists, etc.; if extensive statistics yield but a proportionally small percentage; and, further, if these diseases appear only *rarely and exceptionally* in these men, nevertheless, the exception is important enough for the aural surgeon, in conjunction with competent authorities, to give the subject full attention in the future; for even the exceptional cases might lead repeatedly to danger for those who travel by rail.

He sums up his paper with the following conclusions: I. Locomotive engineers and firemen are liable to affections of the ear with noticeable decrease in hearing, usually in both ears, which may be attributed to their employment; these affections may, perhaps, appear earlier in those who are employed on railroads running through mountainous regions than in those on roads in level countries. II. This acquired deafness appears to be more dangerous than colour-blindness as regards the signal code, because the latter is a *congenital* defect, which can be defined precisely before the individuals are put on active duty, while the deafness is an *acquired* disease, slow in its approach, and often unknown to the person affected, until an accident, *e. g.*, a cold or injury, diminishes the hearing more and more on one or both sides, or destroys it completely. III. The percentage of these affections of the ears can only be fixed by extensive statistics and examinations. The fact of its existence is evident; and even if the percentage were but slight, it is of great importance, for even a single exception may cause danger. IV. The ears should be examined very carefully before a certificate of fitness for duty is given; the examination can and should only be undertaken by a physician who has made a special study of otology, or at least understands how

to examine the ear and to test its functions accurately. V. When a man has acted as fireman for a long time, his promotion to the position of engineer should demand especial precautions in this respect. VI. When his definite appointment has been made, he should be warned that his occupation *may* injure his hearing, and that he should present himself for examination when he notices the slightest defect in this respect. VII. The physician should be sworn to report every case of deafness in firemen or engineers to the superintendent of the road. VIII. The hearing of engineers and firemen should be tested at least once in every two years, so as to avoid all possible danger; perhaps oftener in those who run on tunnelled roads.—*Edinburgh Med. Journal*, May, 1881, from *Zeitschrift für Ohrenheilkunde*, vol. ix. No. 4, p. 370.

MIDWIFERY AND GYNÆCOLOGY.

Gastrotomy in Extra-Uterine Pregnancy.

The propriety of opening the abdomen and removing the fœtus in cases of extra-uterine pregnancy is one of those questions which recent advances in abdominal surgery make it necessary to reconsider. The examination and comparison of cases recorded before the introduction of antiseptic precautions, led those who had most carefully considered the matter to the opinion that it was best to refrain from interference until the sac had suppurated and become adherent to the abdominal parietes; that abdominal section before this time brought with it a greater chance of harm than of good. Since then, many writers and speakers have urged—pointing to ovariectomy as an illustration—that the abdomen ought to be opened early; that with practice, and antiseptic precautions, the results would be quite different from what they have been.

This question has been carefully considered in an able article by Professor LITZMANN, of Kiel.¹ He objects to the earlier statistical tables, on the ground that the cases included in them have not been sifted with sufficient care. His own opinions are based on a collection of forty-three cases, every one of which is recorded in full detail. In ten of these the operation was performed before the death of the child. In favour of operating before the child dies, there are two reasons commonly given—first, that the mother will probably be in fair general health; second, that there is a chance of safety for the infant.

Too much importance must not be attached to the former consideration, because few women go to the end of an extra-uterine pregnancy without some disturbance of health—*e. g.*, slight local peritonitis, hemorrhages, etc. The great source of danger in operating at this time lies in the fact that the placental circulation is still being carried on. Attempts to separate and remove the placenta at the time of operation end in disaster, even if the attempt itself be successful. And if the opening of the sac and extraction of the fœtus be accomplished without disturbance of the placenta, and this be left to spontaneously come away, there is still much risk, for this process is always one of molecular disintegration and sloughing, and is often attended with severe hemorrhage. And the prospect of saving the child is not so very hopeful as it might at first seem; because in extra-uterine pregnancy the child is often imperfectly developed. Out of the ten cases collected, five of the children died within twenty-four hours.

In considering the question of gastrotomy after the death of the child, it is necessary first to study the processes which attend and follow this event. After the death of the child, the liquor amnii begins to be re-absorbed; it also becomes

¹ Archiv für Gynäkologie.

thick, and dirty-red, gray, or brown in colour, from mixture with meconium and blood-pigment. So long as the membranes are entire, putrefaction does not take place, although, if the sac should be closely connected with the bowel, there may be fetor and the evolution of gas. While this is going on, the health of the mother suffers; there are loss of appetite, vomiting, diarrhœa, slight fever, and wasting. But the point upon which the greater or less risk of operative interference hinges is, the changes which take place in the placenta. These, of course, consist first of all in arrest of the circulation and obliteration of the vessels. But it is very difficult to say how long this takes. In some cases, at periods of ten weeks and upwards after the death of the child, it was found possible to separate and remove the placenta without difficulty and without hemorrhage; while in others, in which quite as long a period had elapsed, dangerous hemorrhage followed attempts to do this. In one case, in which the operation was performed four months after the cessation of fœtal movements, thirteen days after the operation, when the elimination of the placenta was nearly complete, an attempt to remove a piece of it produced fatal hemorrhage. These cases show that it is not possible to fix any time by which the placental vessels will have been obliterated, and there will therefore be freedom from risk of hemorrhage in dealing with it.

These considerations lead Dr. Litzmann to the following practical conclusions: He holds that the great maternal risk inseparable from gastrotomy when the child is living, and the placental circulation still being carried on, together with the doubtful prospect of saving the child, should make us, as a rule, decide against this operation, except in cases in which the pregnancy appears to have passed the tenth (lunar) month, and it can be ascertained by examination that the child is not only living, but large and strong, and that the placenta is not in the situation in which the incision will have to be made. In the absence of these indications, Dr. Litzmann's treatment would be expectant: attention to the general health, to nutrition, and the different bodily functions; and if peritonitic symptoms or expulsive efforts should supervene, complete rest, with narcotics, etc.

Should rupture of the sac take place, Dr. Litzmann thinks there is little to be gained by operation. The chance of saving the child is, of course, less than if rupture had not taken place. The advantage, that after the abdomen is opened it can be emptied of the effused blood and foreign matters, he considers more than counterbalanced by the greater peril that, by disturbing the parts, clots will be dislodged, pressure removed, and thus bleeding may be increased, or re-excited if it have ceased. Treatment, therefore, at this period should be expectant, abdominal section being deferred until there is reason to think that the placental circulation has entirely ceased. The exception to this rule is in cases in which signs are present that indicate putridity of the contents of the sac. In that event it should be evacuated without delay.

Unfortunately there are no sure criteria by which we may tell whether the placental vessels have become obliterated or not; and this is the point upon which the main risk of the operation hinges. If a *souffle* has at one time been heard over the tumour, its subsequently ceasing to be audible may give some hope that the placental circulation has stopped. If we wait five or six months after the death of the child we may by that time reasonably hope that the placental vessels will have become closed; but short of that period we cannot tell what their condition may be. Dr. Litzmann advises that the operation be not deferred beyond the time mentioned, for the patient's general condition will from day to day be deteriorating; the risk will therefore be rather increased by longer waiting.

Dr. Litzmann's conclusions may be taken, we think, as representing the present state of our knowledge on this subject, and at present his conclusions as to practice are sound. Nevertheless, we hope that advancing knowledge and surgical enterprise may soon oblige us to reconsider the accepted conclusions on this point. We hope that those who deviate from the safe and customary line of practice will be careful to publish in detail the results of all their cases.—*Med. Times and Gazette*, May 21, 1881.

Inversion of the Uterus.

Dr. ATTBILL, at a recent meeting of the Obstetrical Society of Dublin (*British Medical Journal*, April 16, 1881), read a paper on this subject, in which he treated of its causes, symptoms, and treatment. There were no affections of the uterus in which errors of diagnosis were more frequently made. In four out of five cases which had come under his observation, the existence of inversion was not at first suspected; and in three of them, an attempt was made to remove the tumour, which was supposed to be a polypus, the operation being in each case stopped on account of the pain which the action of the *écraseur* caused. He doubted the correctness of the statement made by Dr. Barnes, that a large majority of cases of inversion followed immediately on delivery.

Of the five cases which he took as the test of his communication, only two occurred after delivery; in the other three, it was due to the presence of a fibrous tumour attached to the fundus of the uterus; moreover, the tumour was in each case sessile, and attached very nearly at the centre of the fundus uteri. He had never seen inversion caused by a pedunculated tumour, or by one attached elsewhere than at the centre of the fundus. So also he had found that, in those cases in which inversion occurred immediately after the conclusion of the second stage of labour, and in which the placenta remained adherent till after the accident had occurred, it was invariably attached to the very fundus. He, therefore, concluded that, "in all cases of inversion of the uterus, whether induced by the presence of a tumour, or occurring as a sequence of labour, the condition was the same in both to this extent, a body, which to all intents was a foreign body, was attached to that part of the uterus which lay between the opening of the Fallopian tubes."

He dissented from the views of those writers who held that the inversion occurring immediately after delivery was due to the weakened condition of the uterine wall at the site of the placental attachment, so long as the placenta remained adherent; and, from the record of cases in which the placenta was found to be adherent after inversion had taken place, it was evident that the inversion frequently—and, in his opinion, probably always—must at least have commenced before the placenta was separated from its attachment. The same remarks applied to tumours of the uterus; nor could he believe that their weight had any real effect in dragging down the fundus. In the case of fibroids, therefore, a further cause, viz., the occurrence of expulsive uterine contractions, was requisite to induce inversion. The fundus was that portion of the uterus most susceptible of irritation, and any foreign body brought into contact with the fundus speedily excited contraction. The presence, therefore, of a tumour attached to the fundus centrally, or of the placenta similarly located, might fairly be presumed to have a tendency to induce expulsive uterine action, which, failing to detach and expel the tumour or placenta, ends in depression and inversion of the fundus; but, for this to occur, he deemed it necessary that the tumour should spring from the fundus, or, if it occurred after parturition, the placenta should be attached nearly centrally to the same portion of the intra-uterine surface.

In reply to the objection which might be raised to this theory of the cause of

inversion, viz., that, if the attachment of the placenta to the fundus were a cause prone to induce inversion, it should be of more frequent occurrence as a sequence of parturition than it was, he stated his belief that Dr. Barnes was mistaken when he asserted that the most natural position for the attachment of the placenta was the fundal one. In his opinion, on the contrary, as the cervical zone was a dangerous placental site, from the tendency to the occurrence of hemorrhage before delivery, so the fundal zone was also an abnormal placental site; and, if the attachment there were central, it became dangerous, as tending to the possible occurrence of inversion from (1) weakening of the part which it was of importance should be firm, and (2) from the risk of the placenta, if not rapidly detached, acting as a stimulus and exciting uterine contractions, which, as in the case of the sessile fibroids, ended in depression of the weak part, and finally in inversion of the fundus. The term "active spontaneous inversion" used by Dr. Duncan, might, he thought, be fairly applied to cases produced in the manner described; only, instead of paralysis of the placental site, he, Dr. Atthill, considered abnormal activity of the muscular fibre of the part to be the distinctive feature of the case.

Dr. Atthill then read the notes of an interesting case of inversion of the uterus, which had been mistaken for polypus on first examination. It occurred in an unmarried woman aged 47. After removal of a sessile fibroid from the fundus, as the uterus resisted all his efforts to repose it, made with Aveling's and White's instruments, he determined to amputate it, to prevent the danger of subsequent attacks of hemorrhage. Although he believed that reposition of an inverted uterus was, in almost all cases, possible, and was usually advisable, he considered that the conditions of the case he had read rendered amputation of the uterus more advantageous to the woman, and less dangerous than the protracted manipulation which would have been necessary to effect its permanent restoration to the normal position. She was unmarried, and had passed the age of probable child-bearing; and the tumour was so vascular, that even digital examination produced profuse hemorrhage.

Extirpation of the Uterus through the Vagina.

Dr. MARTIN (Berlin) relates the history of twelve cases in which he had extirpated the uterus through the vagina. In three cases, the cervix uteri was alone affected; in eight, it was much enlarged and softened; in three, there was adenomatous growth with cancerous masses in the uterine mucous membrane, which caused severe hemorrhage. In four cases only had the uterus retained its normal mobility. As the organ could generally not be drawn down, Dr. Martin operated *in situ*. After irrigating the vagina with a lukewarm solution of carbolic acid, he made an opening into Douglas's space, and fastened the peritoneum by suture to the edges of the vaginal wound. He then made an anterior incision, separated the uterus from its bed of connective tissue as far as its middle, and tilted the organ backwards by means of a hook. This was done more easily when the uterus was made to glide over a spatula introduced into Douglas's space. The broad ligaments were now tied and divided, and the urinary bladder was set free. The hemorrhage attending this proceeding was very slight. The separation of cancerous nodules from the parametrium was not difficult. In four cases the operation was not completed, in consequence of the great extent of the disease and of the existence of inflammatory adhesions of the uterus in front. In one only was there slight injury of the urinary bladder. The ureters were not injured. A drainage-tube having been introduced into Douglas's pouch, the wound was left open, and the vagina was plugged with salicylated cotton-wool and irrigated on the second day. Of the eight cases in which the operation was complete, six

recovered. Dr. Olshausen, in speaking of the vaginal method of extirpating the uterus hitherto employed by him, expressed the hope that it would almost entirely supersede Freund's operation. The latter had only one advantage, that it allowed the extirpation of the lymphatic glands. He objected to Martin's operation *in situ*, that it almost entirely prevented the ligature of single vessels, and rendered manipulation very difficult. Dr. Mikulicz expressed a general approval of Dr. Martin's operation, but disapproved of opening the peritoneal cavity. If, however, the surgeon desired to do this, the method of permanent irrigation formerly recommended by him should be used. Dr. Martin explained that he had met with no insuperable difficulties in operating *in situ*; in cases of necessity, where the vagina was too narrow, the operation might be preceded by a division of the perinæum.—*London Med. Record*, May 15, 1881.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

Poisoning by Chloroform.

The recently issued number of the *Nordiskt Mediciniskt Arkiv* contains a report, by Dr. JOHANNES MYGGE, of Copenhagen, of a fatal case of poisoning by chloroform. The patient was a man of intemperate habits, who had, six days before his admission into hospital, drunk nearly forty grammes (more than ten drachms) of pure chloroform. He appears to have rapidly fallen into a state of narcotism, from which he revived four hours later, without the use of remedies. Immediately after this, he several times vomited matter having a strong odour of chloroform; after this, he had watery and slimy stools, mixed with much blood; and, from the night after the catastrophe, he expectorated large quantities of viscous, frothy, and sanguineous matter. On his admission, hepatization of the lower lobe of the right lung was found; there was copious expectoration of sanguineous and frothy matter; the mouth exhaled a very fetid odour; he had frequent vomitings of bilious matter; his evacuations were fluid and viscous, but not mixed with blood; and he had pain in the epigastrium; sleep was disturbed. He gradually sank, and, after having had slight convulsions, died two days after admission to hospital. The necropsy showed gray hepatization of the lower lobe, and congestion of the other parts, of the right lung, and recent fibrinous adhesions over the whole surface. The mucous membrane of the stomach, over a surface as large as a child's hand, close to the large *cul-de-sac*, was reduced to fibres, and partially detached; and a more limited portion of the anterior wall of the organ was destroyed, with the exception of the serous and subserous membranes. The upper part of the jejunum, for the space of one and a half metres (nearly five feet), presented numerous ulcers, varying in size from a pea to a bean; they were irregular, grayish, partially arranged in transverse lines, and tinged here and there with bile. Nothing of importance was found elsewhere. Dr. Mygge gives a table of sixteen other cases of poisoning by the drinking of chloroform, which have been reported in medical journals, and refers to others. His statistics, however, are incomplete, as the table is only brought down to 1872. He remarks that congestion of the lung has been found in almost every case in which a necropsy has been made; and that in one of the fatal cases there was an expectoration of sanguineous viscous matter similar to that which occurred in this case. As regards the digestive canal, the symptoms observed have been similar in nearly all the cases hitherto described, but less intense than in the present case; and in one case only besides that of Dr. Mygge was any destruction of tissue found.—*British Medical Journal*, April 16, 1881.

OBITUARY NOTICES.

GEORGE ALEXANDER OTIS, Surgeon and Brevet Lieutenant-Colonel, United States Army, Curator of the Army Medical Museum, and Editor of the Surgical volumes of the Medical and Surgical History of the War of the Rebellion, died at Washington, D. C., February 23, 1881, at the comparatively early age of fifty years.

Surgeon Otis was descended from a cultivated New England family. His great-grandfather, Ephraim Otis, was a physician who practised at Scituate, Mass. His grandfather, George Alexander Otis, was a well-known citizen of Boston, Massachusetts, whose early years were occupied by commercial pursuits. Mr. Otis was a man of education and literary tastes, who, so soon as his circumstances permitted, retired from business, and devoted himself entirely to books. He is remembered especially on account of his translation of Botta's History of the War of the Independence of the United States of America, published in 1820, an undertaking in which he was encouraged by James Madison and John Quincy Adams, and which he accomplished so well that the book ran through twelve editions. He died at an advanced age in June, 1863.

The father of Surgeon Otis, also George Alexander Otis, was born in 1804. He attended the preparatory course at the Boston Latin School, studied and graduated at Harvard College, after which he devoted himself, with much promise, to the profession of law. Mr. Otis was married February 9, 1830, to Anna Maria Hickman, of Newton, Massachusetts, daughter of Harris Hickman, a lawyer, born at Front Royal, Virginia, who had enjoyed an excellent professional reputation in early life in the Shenandoah Valley, and subsequently at Detroit, in the then Territory of Michigan. Of this marriage the subject of our biographical sketch was the only issue, Mr. Otis dying of consumption, June 18, 1831.

George Alexander Otis was born in Boston, Massachusetts, November 12, 1830. Left an infant to the tender care of his widowed mother, his early years were nurtured by a devoted love, which accompanied him through youth and manhood, smoothed the pillow of his last illness, and followed him to the grave.

When old enough to go to school, George was sent at first to the Boston Latin School, and afterwards to the Fairfax Institute, at Alexandria, Virginia, where he was prepared for college. In 1846 he entered Princeton College as a student of the sophomore class, and graduated, with the degree of A. B., in 1849. Princeton conferred upon him the degree of Master of Arts in 1852.

At Princeton Otis appeared as a slender, rather delicate youth, of highly nervous organization, whose literary tastes were not satisfied with the comparatively narrow curriculum of his Alma Mater. Always standing well in his college classes, that he did not take a still higher place was not due to lack of ability or of studious habits, but rather to his love of general literature, and the large proportion of his time expended in its cultivation. He had already acquired a fondness for French literature, which he never afterwards lost, and a taste for verse so far cultivated that when he came to graduate the Faculty assigned to him the task of preparing the commencement-day poem. Retiring and reserved in his manners, often silent and abstracted, the few who were admitted to his intimacy found his nature gentle and sympathetic, and several of the friendships he then formed lasted throughout his life.

By this time Otis had selected medicine as his profession. After leaving Princeton he went to Richmond, Virginia, where his mother was then residing, and began his studies in the office of Dr. F. H. Deane, of that city. In the fall of 1849 he proceeded to Philadelphia, and matriculated in the Medical Depart-

ment of the University of Pennsylvania. That institution conferred upon him the degree of Doctor of Medicine in April, 1851. In those days the medical teachings of the University of Pennsylvania were shaped in no small degree by the influence of the School of Paris. Indeed, this was then true of almost all American medical teaching, and ambitious American medical students still looked with enthusiasm towards the lecture-rooms and hospitals of the French capital as affording the richest opportunities for the completion of their medical education. Accordingly Otis spent in Paris the first winter after he graduated in Philadelphia. He sailed from New York on the 16th of August, and reached Paris in the latter part of September, 1851.

During his stay in Paris Otis made diligent use of the opportunities afforded for professional improvement. A manuscript note-book left among his papers shows that he devoted much time to the clinical teachings of the great French masters of that day. He listened to the instructions of Louis, Piorry, Cruveilhier, and Andral. It was at the time his expectation to give especial attention to the subject of ophthalmic surgery, and accordingly he attended with great diligence the clinics and didactic lectures of Desmarres, but he found the attractions of general operative surgery too strong to permit exclusive attention to this chosen branch, and he continually watched the operations, and listened to the lessons of such surgeons as Nélaton, Civiale, Malgaigne, Jobert (de Lamballe), Roux, and Velpeau. Moreover, the popular excitement which preceded the coup d'état of December 2, 1851, and the probability of bloodshed, directed his attention to the subject of military surgery. Already, November 4th, his note-book records a morning spent at the library of l'Ecole de Médecine in the study of Baron Larrey's "Mémoire," with which he was so well pleased that he at once purchased a copy for closer study. After the coup d'état a considerable number of those wounded at the barricades were carried to the hospitals for treatment, and Otis was thus enabled to take his first practical lessons in military surgery from Velpeau, Roux, and Jobert (de Lamballe).

Meanwhile, however, his diligence in medical studies did not prevent him from spending many pleasant hours in the art galleries and museums, where he found much to gratify his æsthetic nature. Moreover, he took a deep interest in the stirring panorama of French politics, as is shown by a series of letters he took time to write to the *Boston Evening Transcript*.

In the spring of 1852 Otis returned to the United States, reaching New York in the latter part of March. Immediately after his return he established himself at Richmond, Virginia, where he opened an office for general medical and surgical practice, and where his tastes and ambition soon led him to embark in his earliest enterprise in the domain of medical literature. In April, 1853, he issued the first number of *The Virginia Medical and Surgical Journal*. Dr. Howell L. Thomas, of Richmond, was associated with him as co-editor, but the financial risk was assumed entirely by Otis. The journal appeared monthly, each number containing over eighty pages octavo, the whole forming two annual volumes, commencing respectively with the numbers for April and October. It was handsomely printed, and contained from time to time a fair share of original articles, chiefly by physicians residing in Richmond and other parts of Virginia; but its most striking characteristic was the number of translations and abstracts from current French medical literature which appeared in its pages. Dr. Thomas, like his colleague, was a good French scholar, and had studied in Paris; both took part in the labour of translation and condensation, and as most of the articles were unsigned, it is not always possible to ascribe particular ones to the proper editor.

Notwithstanding its merits several causes contributed to interfere with the financial success of the journal. On the one hand, it was unsupported by the influence

and business connections of any established publishing house, or of the faculty of any medical college. On the other hand, the success it might perhaps otherwise have achieved as a local organ of the medical profession in Virginia was impaired by the existence of an already-established rival, *The Stethoscope*, a monthly medical journal edited by Dr. P. Claiborne Gooch, at that time Secretary of the Medical Society of Virginia.

The field of local patronage was not large enough to support two such journals, and both suffered from the competition. Before the close of 1853 Otis found it necessary to secure an associate who could share in the pecuniary support of his enterprise. Thomas retired from the editorship, and was succeeded, after the issue of the December number, by Dr. James B. McCaw, of Richmond, who became also part owner of the journal. *The Stethoscope* appears to have suffered still more, for about the same time its editor entered into negotiations with the Virginia Medical Society, as a result of which he sold the journal, and the number of *The Stethoscope* for January, 1854, appeared as "the property and organ of the Medical Society of Virginia, edited by a committee of the society."

This arrangement was, undoubtedly, for a time very prejudicial to the prosperity of the *Virginia Medical and Surgical Journal*, but its editors bravely maintained the struggle, and in the heated discussion concerning the purchase of *The Stethoscope*, that took place during the meeting of the Medical Society of Virginia in April, 1854, Otis, with characteristic gallantry, refused to surrender his independence to secure the passage of resolutions complimentary of the management of his journal.

Otis had, by this time, become dissatisfied with his prospects of professional success in Richmond, and circumstances led him to select Springfield, Massachusetts, as his place of residence. He removed to that town during the summer of 1854. This necessitated changes in the management of the *Virginia Medical and Surgical Journal*. In May, 1854, Dr. J. F. Peebles, of Petersburg, Virginia, became associated with McCaw as one of its editors, while Otis retired from active participation in its direction, retaining, however, a literary connection with it as corresponding editor.

Meanwhile, a single year proved sufficient to disgust the Virginia Medical Society with the task of editing a journal. Its management was found fruitful of unfortunate dissensions, and in May, 1855, the society wisely concluded to sell out. Under new auspices *The Stethoscope* continued to appear monthly until the close of the year, when an arrangement was effected by which it was united with *The Virginia Medical and Surgical Journal*, under the title of *Virginia Medical Journal*, with McCaw as editor, and Otis as corresponding editor.

Although his residence in Richmond had failed to secure for Otis a lucrative practice, this could not well have been expected at his early age. It had, however, given him some opportunities for acquiring experience at the bedside as well as in literature, and if he did not secure the profitable favour of the laity, he at least won for himself the respect and confidence of his professional brethren. He was an active member of the Virginia Medical Society, and represented that body in the American Medical Association at the Richmond meeting of May, 1852. He was also a member of the Richmond Medico-Chirurgical Society, which he represented in the American Medical Association at the New York meeting of May, 1853.

Established at Springfield, Massachusetts, Otis occupied himself more exclusively than heretofore with the duties of private practice, and with better pecuniary success than he had enjoyed at Richmond. He continued for a time to contribute translations, abstracts, and various items to the *Virginia Medical Journal*; but as the demands of his business became more urgent these became fewer,

although he continued to be nominally corresponding editor of that journal until the close of 1859. As time wore on he began to obtain considerable local reputation as a skilful surgeon, and would probably have acquired both wealth and distinction in civil surgical practice but for the outbreak of the War of the Rebellion. This changed the whole tenor of his life. So soon as it became clear to his mind that the struggle was likely to be a prolonged one, he resolved to devote himself to the service of his country. He received from Governor Andrew the appointment of Surgeon to the 27th Regiment of Massachusetts Volunteers, of which Horace C. Lee was Colonel, and was mustered into the service of the United States, September 14, 1861.

The 27th Regiment was raised in the western part of the State of Massachusetts, and was mustered into the service of the United States at Springfield. It left the State November 2, 1861, and proceeded by rail to the vicinity of Annapolis, Maryland, where it went into camp. Here it remained until January 6, 1862, when it was embarked on transports, and accompanied the North Carolina Expedition under General Burnside. It took part in the affair on Roanoke Island, February 8th; landed near Newburn, North Carolina, March 13th, and met with considerable losses during the battle of Newburn on the following day. The regiment remained in North Carolina until October 16, 1863, when it embarked for Fortress Monroe, Virginia, and after a short encampment at Newport News, proceeded to Norfolk, Virginia, where it remained through the following winter.

During almost the whole of this time Surgeon Otis accompanied his regiment and shared its fortunes; sometimes, indeed, performing other duties in addition to his regimental ones, as during the summer and fall of 1862, when he acted as Medical Purveyor to the Department of North Carolina. The exceptional periods were a few days in September, 1862, when he went as medical officer in charge of the steamer "Star of the South" with sick from Newburn to New York, and a few months in the early part of 1863, when he served on detached duty in the Department of the South. While in the Department of the South he attracted the attention of Surgeon Charles H. Crane, U. S. Army, then Medical Director of the Department (afterwards Assistant Surgeon-General of the Army), on whose recommendation he was placed, March 28th, by command of General Hunter, in charge of the hospital steamer "Cosmopolitan," then at Hilton Head, South Carolina, and directed the operations of that vessel in the transportation of the sick and wounded within the limits of the department until May 10, when he was ordered to carry a number of sick and wounded to New York harbour, and, after landing them, to turn over the vessel to Surgeon Wm. Ingalls, of the 5th Massachusetts regiment. This order was promptly executed, the vessel was turned over as directed, May 13th, and Otis received a leave of absence for twenty days, at the expiration of which he returned to his regiment.

January 22, 1864, he was again detached and ordered to Yorktown, Virginia, to assume the duties of surgeon-in-chief of General Wistar's command. This responsible position he filled in a satisfactory manner from the first of February, when he reported for duty at Yorktown, until April 11th, when he was relieved and assigned as surgeon-in-chief to General Heckman's division of the 18th Army Corps, then encamped near Portsmouth, Virginia. May 10th he received a sick leave for fifteen days, which, as his health was not restored at its expiration, was extended for thirty days more. June 26, 1864, he tendered his resignation as surgeon of the 27th Massachusetts regiment, and received an appointment as Assistant Surgeon of United States Volunteers, to date from June 30, 1864.

At this time business connected with his resignation and re-appointment brought Otis to Washington, where he renewed his acquaintance with Surgeon Crane, then on duty in the Surgeon-General's Office. Surgeon Crane, while Medical

Director of the Department of the South, had been most favourably impressed with the culture and ability of the Massachusetts surgeon, and now so effectually commended him to the Acting Surgeon General as to induce that officer to ask his detail for duty in his office. An order to that effect was issued by the Secretary of War July 22, 1864, and Otis was immediately assigned as an assistant to Surgeon John H. Brinton, U. S. Volunteers, at that time Curator of the Army Medical Museum, and engaged in the duty of collecting materials for the Surgical History of the War of the Rebellion. August 30, 1864, Otis was promoted to the rank of Surgeon of Volunteers, and October 3, 1864, was ordered to relieve Surgeon Brinton of his various duties.

From the first Otis devoted himself with signal zeal and ability to the large and important duties of his new position. Immediately after he took charge of the Surgical Division he inaugurated a system of record books, which proved ultimately of great service in securing the accurate and complete record of individual cases for use in the Surgical History. The rapidly increasing surgical collection of the Army Medical Museum also received great attention from him, and he expended much time in its supervision and study.

Immediately after the close of the war, the Surgeon General of the Army became desirous of securing, by appropriate legislation, the funds necessary to complete and publish the Medical and Surgical History of the War. Accordingly he called upon Otis, and his colleague, Woodward, who had charge of the collection of materials for the Medical History, and of the medical branches of the Museum, to make reports on the extent and nature of the materials collected for the purpose in question. These reports were published by the Surgeon-General November 1, 1865, as 'Circular No. 6,' for the year 1865. This circular was widely distributed, attracted great attention at the time, and satisfactorily attained the object which led to its publication. It formed a quarto volume of 166 pages, with a number of illustrations intended to indicate the character of those regarded as desirable for the Medical and Surgical History. The first half of the volume was occupied by the Surgical Report prepared by Otis. It was a thoughtfully prepared document, which excited the universal admiration of military surgeons in Europe as well as in America.

It became necessary after the close of the war to retain many of the staff surgeons of volunteers in the service for duty in the general hospitals or other purposes after the great armies had been disbanded, and Otis was of course retained with that rank as long as possible; but it was foreseen that the great work he had commenced would occupy a number of years, and he was induced to make arrangements for entering the army as an assistant surgeon. Accordingly he passed the examination prescribed by law, and February 28, 1866, received an appointment as Assistant Surgeon, U. S. Army, but he was not finally mustered out of service as surgeon of volunteers until June 4, 1866, and hence did not accept his commission as Assistant Surgeon, U. S. A., until the 6th of that month.

Meanwhile Otis was devoting himself to the study and arrangement of the materials collected for the Surgical History with indefatigable energy, and while engaged upon that work received authority to publish two preliminary studies on special subjects connected therewith, which greatly increased the reputation he had won by his report in Circular No. 6. The first was *A Report on Amputations at the Hip-joint in Military Surgery*, published as Circular No. 7, Surgeon-General's Office, July 1, 1867. In this he not merely presented and analyzed the histories of the several amputations at this joint reported to the Surgeon-General's Office during the civil war, but discussed with the critical abilities of a master the whole literature of the subject so far as it was at the time

accessible to him. An examination of this monograph shows that he had already pretty well begun to emancipate himself from the leading-strings of the French school, and had fully acquired the desire so manifest in his subsequent work to compare and weigh all accessible human knowledge on each branch of his subject before arriving at his own conclusions.

These characteristics were, if possible, still more fully displayed in the second of the studies referred to: *A Report on Excisions of the Head of the Femur for Gunshot Injury*, published as Circular No. 2, Surgeon-General's Office, January 2, 1869; a monograph in which the subject was treated in a manner similar to that of Circular No. 7, but with a still greater wealth of literary resources. The appearance of each of these monographs was welcomed with acclamations of praise, in which the authoritative expressions of approval by the recognized masters of European surgery were united with the encomiums of the American military surgeons.

Great interest in the forthcoming Surgical History of the War was excited by these publications, and very high expectations were formed, which, however, were fully realized by the character of the *First Surgical Volume*. This volume was issued in 1870. It treated of the special wounds and injuries of the head, face, neck, spine, and chest, was richly illustrated, and discussed the vast amount of material collected during the civil war, in connection with the several subjects treated, with characteristic learning and ability. The *Second Surgical Volume* was issued in 1876. It treated of the wounds and injuries of the abdomen, pelvis, back, and upper extremities. Fully equal in interest and execution to the first volume, it was much more voluminous. The two volumes represent a prodigious amount of patient labour on the part of the editor. The extremely favourable manner in which they were received in surgical circles at home and abroad is well known.

During the interval between the appearance of these two volumes, and subsequently, Otis found time to prepare and publish several valuable reports on subjects connected with military surgery, of which the most important were: *A Report of Surgical Cases treated in the Army of the United States from 1865 to 1871*, issued as 'Circular No. 3,' from the Surgeon-General's Office, August 17, 1871; *A Report on a Plan for Transporting Wounded Soldiers by Railway in time of War*, Surgeon-General's Office, 1875, and *A Report on the Transport of Sick and Wounded by Pack Animals*, issued as 'Circular No. 9,' from the Surgeon-General's Office in 1877. A full list of his official and other publications would occupy too much space to be presented in this place.

In the midst of this successful but laborious career, during the month of May, 1877, his health, never very robust, gave way; and although he survived for several years, he was a constant invalid, to whom death came in the end as a welcome release from suffering. He was engaged at the time of his death on the third surgical volume, which he has left in an unfinished condition; a colossal fragment that must require great labour to complete in a manner worthy of the first two volumes.

Otis received the appointments of captain, major, and lieutenant-colonel by brevet, to date from September 29, 1866, "for faithful and meritorious services during the war." He was promoted to be surgeon in the army, with the rank of major, March 17, 1880. He was elected a foreign member of the Medical Society of Norway, October 26, 1870; a foreign corresponding member of the Surgical Society of Paris, August 11, 1875, and an honorary life member of the Massachusetts Medical Society in February, 1877. He was also at the time of his death a member of the Philosophical Society of Washington, and of the Academy of Natural Sciences of Philadelphia.

In expressing his high appreciation of the character and value of the surgical works of his late colleague, the writer of these pages does but echo the universal language of competent critics throughout the civilized world. On all sides the opinion has been expressed that they have not only made the name of Otis illustrious, but have reflected the greatest credit upon the intelligent liberality of the government of the United States, and upon the Medical Corps of the Army.

During his connection with the Museum, Otis always took deep interest in the anatomical collection, now embracing about two thousand human crania. As early as January, 1873, the Surgeon-General at his instance made a fruitless endeavour to procure an appropriation for the publication of an illustrated catalogue of this valuable collection. To facilitate this object Otis prepared a checklist of the specimens, which was printed in 1876, but the pecuniary means for preparing and publishing the larger work have not yet been provided.

Until his last illness Otis retained much of the fondness for polite literature which characterized him in early life. He had, moreover, considerable taste for music and the fine arts. These qualities made his companionship charming to those who enjoyed his intimacy. Hesitating, often embarrassed, in his manner in ordinary conversation, especially with strangers, he became eloquent when warmed by the discussion of any topic in which he took interest, and he took interest in a great variety of subjects besides those directly connected with the work of his life.

Many warm personal friends share the grief of his family at his untimely death, which, as has been well said by the Surgeon-General, "will be deeply deplored not only by the Medical Corps of the Army, but by the whole medical profession at home and abroad."

J. J. W.

ISAAC RAY, M.D., LL.D., formerly Superintendent of the Butler Hospital for the Insane at Providence, R. I., and late President of the Association of Medical Superintendents of American Institutions for the Insane, died at Philadelphia, on the 31st of March, 1881, aged 74 years.

Of all those, who either in this country or elsewhere, have been devoted to the care of the insane, and have been widely known, and specially distinguished for long service as medical directors of hospitals for the insane, and for able treatment of this class of sufferers, no less than as authors of a high character—few, if any, have attained a more distinguished, or more deserved eminence than the subject of this notice.

As numerous able papers from his pen have appeared at various times in this Journal, it is especially proper, that something more than a brief notice of his long and remarkably useful life should be given in its columns.

The death of such a man as Dr. Ray, in the full maturity of years and wisdom, with a profound practical knowledge rarely possessed by any one, of the branches of medicine to which he was devoted, is no ordinary loss to society, to the profession of which he was so honoured a member, and to that class of the afflicted; by whom the benefit of his services was most frequently solicited.

Isaac Ray, M.D., LL.D., was descended from an honest and intelligent, but not peculiarly distinguished New England family. He was born in the town of Beverly, Massachusetts, on the 16th of January, 1807. It was there that he commenced his early education, soon, however entering Phillips' Academy, at Andover, Mass., and subsequently Bowdoin College, at Brunswick, Me., where he remained a most diligent student till the year 1824, when he was compelled to leave on account of the impaired condition of his health. It may be mentioned as indicative of one of the traits of his character, conspicuous through life—that of never leaving any of his time unemployed—that during his vacations, he was en-

gaged in the honourable position of teaching school, held by so many of the distinguished men of this country in the commencement of their careers, in which vocation he showed marked ability.

As soon as his health was sufficiently improved he began the study of medicine in the office of Dr. Hart, of Beverly, and subsequently spent a considerable time with Dr. Shattuck, of Boston, and graduated at the Medical Department of Harvard University in 1827. He began the practice of his profession in the city of Portland, Maine, in the same year. While a resident of this town he delivered his first course of lectures, which were on Botany, a branch of science in which he always felt much interest. It was at one of these lectures, that he first met Miss Abigail May Frothingham, a daughter of Judge Frothingham, of Portland, a most estimable lady, to whom he was married in 1831, and who now survives him, after a happy union of within just two months of fifty years. From this marriage were born two children, the elder a daughter, of lovely character, who died at the age of fourteen, and a son of whom more special mention will be made in a subsequent part of this notice.

About two years after beginning the practice of his profession at Portland, inducements were offered to Dr. Ray to remove to Eastport in the same state, in which town he afterwards fixed his residence.

It was while living in Eastport that Dr. Ray first became interested in insanity and the treatment of the insane, and circumstances that occurred in the trial of certain cases in the courts of Maine, with the enunciation of the then prevalent views in regard to the responsibility of the insane, led him to undertake the preparation of a work, that has since become familiar to the medical and legal professions everywhere, and which is recognized as a standard authority wherever the English language is spoken. "The Jurisprudence of Insanity" is now so well known that it is scarcely necessary in this connection to do more than to say that at the time of its publication it was far in advance of public opinion, and that the sentiments expressed in it were so different from what had been received as fully established, that as might have been expected, for a time, it met with not a little adverse criticism, especially from sources not acquainted with the disease. It was not long, however, before its true character was acknowledged and properly appreciated, and no higher authority on the subjects referred to, is now to be met with anywhere. Six editions of it have been exhausted, and it was one of Dr. Ray's regrets during his last days, that he was unable to prepare a seventh, which had been asked for by his publishers, and for which he had valuable additional materials.

In the year 1841, Dr. Ray received the appointment of Medical Superintendent of the Maine Hospital for the Insane, at Augusta, and at once assumed the duties of that position, remaining in it till he was invited by the Board of Managers of the Butler Hospital, at Providence, Rhode Island, to become Superintendent of that institution—which was then about to be organized—and to undertake the supervision of the erection of the buildings.

Dr. Ray's observations as the Superintendent of a State institution had given him valuable experience in regard to this class of hospitals, and had showed him the weak points likely to occur in their management, and conspicuously the risks of political influence or personal advantage being allowed to jeopardize the best interests of the insane by sacrificing—as has too often occurred in our country—the very best men for such positions, simply because they could not be induced to do anything they deemed wrong, or that would lessen the usefulness of an institution. On all such points Dr. Ray held emphatic opinions, and his views most vigorously expressed have done much to secure a proper mode of organization for most of the hospitals for the insane in this country.

Dr. Ray found in his new position at Providence, much that made the place particularly pleasant to him. It permitted him to carry out many of his views of construction and organization; none of those connected with the management of the institution, were likely to allow political motives ever to influence their actions, and their stations in society were such as to place them above all suspicion of being actuated by selfish motives in its government. Besides this, an opportunity was given him to carry out a long cherished desire to visit the more prominent institutions for the insane in Europe, and of comparing by personal observation the advantages and the defects of these institutions here and abroad. As soon as possible after his appointment, Dr. Ray sailed for Europe and made the best use of his time in visiting and examining a large number of the most noted hospitals for the insane in Great Britain and on the continent. After his return he devoted himself to the erection of the Butler Hospital, which was opened for the reception of patients under his superintendence in 1847. He continued to fill this office with very marked ability, and to the satisfaction of all who were interested in it, till January 1867, when his impaired health compelled him, to the regret of every one in any way connected with the institution, to resign a post in the performance of the duties of which, he had had so much enjoyment.

Thus released from the cares and anxieties everywhere incident to the conscientious management of a large hospital for the insane, he appreciated greatly the rest that was now allowed him. He spent the greater part of the year in visiting his professional brethren, and in selecting a place for his future residence, finally choosing the city of Philadelphia, in which he settled in the autumn of 1867, and where he continued to live, till his death at his residence on Baring Street on the morning of the 31st of March, 1881, being then in the 75th year of his age. The change of climate, and the release from labour and unavoidable cares, had a beneficial effect on Dr. Ray's health, and from being unable to walk but a short distance, he became strong enough to extend his daily walks as far as four or five miles. This improved condition of his health gave him new pleasure in his literary work, and in an interested attention to the many cases, in which his opinion was asked as an expert, or in consultation with his medical brethren.

Dr. Ray was a member of many professional associations, and in any with which he was connected he was always found to be an active, intelligent, and valuable associate.

He was one of the thirteen superintendents who, in the year 1844, established the Association of Medical Superintendents of American Institutions for the Insane, and was always deeply interested in its proceedings, rarely absent from its meetings, and scarcely ever failing to read suggestive papers, or to engage to the satisfaction of all, in its most important discussions. He recognized fully the importance of the Association, and the value to the community and the insane of the great work it had accomplished. He was always one of the staunchest of its defenders, when assailed by perhaps well meaning, but impracticable writers, and a most valuable supporter of the "Propositions" which have now stood the test of more than a quarter of a century's trial in every section of the country. To this result his voice and writings contributed largely. He was President of this Association from 1855 to 1859. At its meeting at Providence he was the recipient of distinguished attentions from his old associates, friends, and neighbours, as well as from the Rhode Island Medical Society (of which he was at one time President), and from Brown University, which at this time conferred upon him the honorary degree of Doctor of Laws.

Elected a Fellow of the College of Physicians of Philadelphia, he always manifested great interest in its transactions, was a regular attendant of its meetings, and a participant in the discussions which were elicited by the reading of

papers. The esteem by which he was held by this body may be judged by the resolutions adopted at the time of his decease.

He was one of the original projectors of the Social Science Association, and was thoroughly interested in all its work. His papers read before it were always indicative of a thorough study of the subjects coming under the observation of this Association, and his suggestions rarely failed to have practical worth. There were, indeed, few matters of any kind, political or social, that interested the community, which did not receive the benefit of his matured views and well considered conclusions, either through the public press or in his writings of a more permanent character.

He was appointed by the Judges of Philadelphia one of the Guardians of the Poor of the city, and to this important trust, he at once gave no small share of his time and attention. His lifelong studies, as well as his practical knowledge as a hospital superintendent, qualified him in an eminent degree to detect the defects of the system long in practice in the Philadelphia Almshouse, and no one could be better fitted to suggest the changes that were necessary to make the portion of that institution devoted to the insane, worthy of the name of a hospital, and capable of giving the greatest amount of good to its inmates. No better proof of the false system of a political management for benevolent institutions could be given, than the fact, that notwithstanding the devoted and unrecompensed services of such a man as Dr. Ray, those in authority were willing to dispense with them, and to replace him and men of equal integrity, by persons who, no one could claim, had the first elements of qualification for such a position.

Dr. Ray was about the medium height, and did not possess a very robust constitution. His grave and marked features, his abundant hair, for many years entirely white, and always somewhat in disorder from his manner of treating it, made him, although of moderate stature, a striking object whenever he appeared in court or in any deliberative body. And the effect of his presence was increased when he spoke, by the clearness and distinctness of his language, by his dignified manner, and by the conviction, which his impressive mode of treating a case rarely failed to bring to his hearers, that they were listening to one who was thoroughly familiar with his subject, and whose testimony was based on a careful study of the case, and an earnest desire to arrive at just conclusions in reference to it.

For many years he had been troubled with a cough and copious expectoration, which seemed to be bronchial in its character, but which did not appear very materially to affect his general health, and which Dr. Ray after consultation with able authorities, concluded could not be relieved by any special treatment. Indeed in his ordinary pursuits he seemed able to do all that could reasonably be expected of him, and it was not until the sudden and unexpected death of his only son, and for many years his only child, to whom he was devotedly attached, that any material change in his condition was observed. Dr. B. Lincoln Ray, the son alluded to, was an accomplished writer, and a highly educated physician, many of whose productions must be familiar to the readers of this Journal, to which he was a frequent and always welcome contributor, especially in the critical and review department, in which he manifested peculiar ability. Although of a vigorous-looking physical development, he had not been well for many months, and he himself seemed conscious that a serious brain trouble was impending. The very last visit he paid, was made in company with his honoured father, to the writer of this notice, then suffering from a serious illness, and at this time those about him noticed indications of what within a few days was developed suddenly into unmistakable cerebral disease of the most serious character, and of which after great suffering he died within a period of less than two days.

This sudden loss of such a son to whom he was deeply attached, of whose abilities he was justly proud, and to whom his parents had looked forward as the support of their advancing years, was a shock to the elder Dr. Ray from which he never recovered. Although his interest in his friends and in public affairs remained undiminished, to his intimate associates there was, after this sad event, from the first, a change that was unmistakable, and to them it was obvious that a single week had done the work that ought hardly to have been expected from years in the ordinary current of life. He ceased to write with his accustomed interest, complained of its being a toil to him to do so, and mourned that he was unable to carry out many of his plans, and that his anticipations of a literary executor familiar with all his views, and who would have done justice to his labours, were gone forever. He was always uncomplaining. Although his cough was at times troublesome, and now and then he had some oppression in his breathing, he suffered little pain. Afterwards he found it best that he should avoid all active exercise, as, for some time before he was confined to his house, great discomfort had been the certain result of even a moderate amount of walking, of which formerly he had been so fond, and to which a portion of every day had been regularly devoted. From the time of his confinement to his house, his days were mostly spent in an easy chair which had been given to him by an esteemed brother superintendent, and for the weeks after he ceased to go down stairs, he still spent a part of each day reclining in this chair near the projecting window of his room, passing the time in reading or in looking out upon the active scenes of the street, or the beautiful gardens beyond it. His strength, however, gradually failed; day by day he grew weaker, and his emaciation became somewhat distressing to him, still almost without an exception, some part of every day found him in his wonted position in his easy chair, and each night after being wheeled in it to the door of the adjoining room, he walked with assistance to his bed.

After retiring at the usual hour on the 30th of March, he had a troublesome spell of coughing, but when it had passed he slept calmly and only once inquired the time of the night. So quiet and so calm was his sleep, that he made no movement, uttered no sound, but when approached in the morning, it was found that his noble spirit (probably some time before) had passed from this world to that where the weary are at rest, and so peacefully, that his devoted wife resting by his side had no idea how long before the great change had occurred. It was such an end as Dr. Ray would have asked for, well fitting the simplicity and the quiet dignity of his character. It was touching, too, that his spirit should thus have passed away, his bed surrounded by the valuable collection of books he had loved so well, for as a matter of convenience he had turned his library into his sleeping room, and had rested there during the last nights of his life.

Thus closed the career of one recognized by his fellow-men everywhere, as one who had passed a long life of unselfish usefulness, and the beneficent results of whose labours will live long after him. Although to a stranger Dr. Ray's manners might at first seem somewhat austere, this opinion would be corrected by a short acquaintance. With his intimate friends and associates he had the most genial qualities. His conversational powers were quite remarkable, for he talked well upon every subject, and what he said was interesting alike to the gravest judge, to the most profound specialist, and to the little children with whom he was always a favourite. His ability of adapting himself to the society he was with, was indeed one of the striking features of his powers of conversation, which have not often been surpassed. Those who knew him best, loved him most, and appreciated most highly his varied traits of character, his gentleness and firmness, his unselfish interest in his fellow-men, and his readiness to give his valuable time for the benefit of those who were in affliction and sorrow.

T. S. K.

UNIVERSITY OF PENNSYLVANIA—MEDICAL DEPARTMENT.

Thirty-Sixth Street and Woodland Avenue (Darby Road), Philadelphia.

One Hundred and Sixteenth Annual Session, 1881-82.

PROFESSORS.

WILLIAM PEPPER, M.D., Provost.
HENRY H. SMITH, M.D., Emeritus Professor of Surgery.

JOSEPH LEIDY, M.D., LL.D., Professor of Anatomy.

RICHARD A. F. PENROSE, M.D., LL.D., Professor of Obstetrics and Diseases of Women and Children.

ALFRED STILLÉ, M.D., LL.D., Professor of Theory and Practice of Medicine, and Clinical Medicine.

D. HAYES AGNEW, M.D., LL.D., John Rhea Barton Professor of Surgery and Clinical Surgery.

WILLIAM PEPPER, M.D., Professor of Clinical Medicine.

WILLIAM GOODELL, M.D., Professor of Clinical Gynecology.

JAMES TYSON, M.D., Professor of General Pathology and Morbid Anatomy.

HORATIO C. WOOD, M.D., Professor of Materia Medica, Pharmacy, and General Therapeutics.

THEODORE G. WORMLEY, M.D., LL.D., Professor of Chemistry.

JOHN ASHHURST, JR., M.D., Professor of Clinical Surgery.

HARRISON ALLEN, M.D., Professor of Physiology.

WILLIAM F. NORRIS, M.D., Clinical Professor of Diseases of the Eye.

GEORGE STRAWBRIDGE, M.D., Clinical Professor of Diseases of the Ear.

HORATIO C. WOOD, M.D., Clinical Professor of Nervous Diseases.

LOUIS A. DUHRING, M.D., Clinical Professor of Diseases of the Skin.

Matriculates who have not received a collegiate degree are required to pass a preliminary examination in English and Physics (for details of which see Announcement), and to attend three winter courses of instruction of five months each, consisting of graded didactic lectures, clinical lectures, and practical work in laboratories and hospitals.

In the graded curriculum adopted, the elementary branches are taught in the *first* course, and students are finally examined at its conclusion upon General Chemistry, Materia Medica and Pharmacy. In the *second* term, while a sufficient repetition of unfinished branches is secured, certain more practical ones are added, and the examinations on Anatomy, Physiology, and Medical Chemistry at the end of the term are final. In the *third* course is added practical bedside instruction in Medicine, Surgery, and Gynecology, with clinical facilities in the specialties: and, at its end, students are examined on General Pathology and Morbid Anatomy, Therapeutics, Theory and Practice of Medicine, Surgery, and Obstetrics.

Students, who have attended one course in a regular* medical school, will be admitted as students of the second course in the University, after having satisfactorily passed an examination in General Chemistry and Materia Medica and Pharmacy. Students who have attended two courses in a regular medical school, will be admitted as students of the third course after examination in General and Medical Chemistry, Materia Medica and Pharmacy, Anatomy, and Physiology.

Graduates of other regular medical schools in good standing will be admitted as students of the third course in this institution without any examination.

Graduates of Colleges of Pharmacy and Dental Colleges in good standing are admitted to the second course in the University without an examination.

In the *Spring Session*, beginning the latter part of March, and ending about the middle of June, a valuable course on practical and scientific subjects by a large corps of professors and lecturers is given; and the laboratories of Chemistry, Pharmacy, Histology, Physiology, and Pathology are open, affording a valuable post-graduate course.

A course of practical instruction for graduates has been established, for particulars of which see the Announcement of the Medical Department.

The Lectures of the Winter Session of 1881-82 will begin on Monday, October 3, and end on the last day of February.

The Preliminary Course will begin on the second Monday in September.

FEES IN ADVANCE.—1st course of lectures, including matriculation and dissection, \$155. Dissecting material one dollar a part. 2d course, including dissection, \$150. 3d course, including operating and bandaging, \$110. Graduation fee \$30.

For Announcement giving full particulars address

JAMES TYSON, M.D., SECRETARY,
P. O. Box 2838, Philadelphia.

* Homœopathic and Eclectic schools are not recognized as being in this category.

JEFFERSON MEDICAL COLLEGE,

PHILADELPHIA.

THE Fifty-seventh Session of the Jefferson Medical College will begin on Monday, October 3d, 1881, and will continue until the end of the third week of March, 1882. Preliminary Lectures will be held from Monday, 12th of September.

PROFESSORS.

JOSEPH PANCOAST, M.D.,
General, Descriptive, and Surgical Anatomy
(Emeritus).

S. D. GROSS, M.D., LL.D., D.C.L. Oxon.,
LL.D. Cantab.,

Institutes and Practice of Surgery.

ELLERSLIE WALLACE, M.D.,
Obstetrics and Diseases of Women and
Children.

J. M. DA COSTA, M.D.,
Practice of Medicine.

WM. H. PANCOAST, M.D.,
General, Descriptive, and Surgical Anatomy.

ROBERT E. ROGERS, M.D.,
Medical Chemistry and Toxicology.

ROBERTS BARTHOLOW, M.D., LL.D.,
Materia Medica and General Therapeutics.

HENRY C. CHAPMAN, M.D.,
Institutes of Medicine and Medical
Jurisprudence.

The enlargement of the College, now in progress, will enable the Faculty to perfect the present system of *Practical Laboratory Instruction*, in all the Departments. Rooms are assigned in which each Professor, with his Demonstrators, will instruct the Class, in Sections, in direct observation and hand-work in the Chemical, Pharmaceutical, Physiological, and Pathological Laboratories. Operative and Minor Surgery, and investigation of Gynæcological and Obstetric conditions on the *Cadaver*, will be taught, as also Diagnosis of Disease on the living subject.

This course of Instruction is *free of charge*, but *obligatory upon* candidates for the Degree, except those who are Graduates of other Colleges.

A SPRING COURSE of Lectures is given, beginning early in April, and ending early in June. There is no additional charge for this Course to matriculates of the College, except a registration fee of five dollars; non-matriculates pay forty dollars, *thirty-five of which, however, are credited on the amount of fees paid for the ensuing Winter Course.*

CLINICAL INSTRUCTION is given *daily* at the HOSPITAL OF THE JEFFERSON MEDICAL COLLEGE throughout the year by Members of the Faculty, and by the Hospital Staff, which is constituted as follows:—

Surgeons.

JOHN H. BRINTON, M.D.,
S. W. GROSS, M.D.,
R. J. LEVIS, M.D.

Ophthalmic Surgeon.

PROF. WILLIAM THOMSON, M.D.

Aural Surgeon.

L. TURNBULL, M.D.

Physicians.

J. SOLIS-COHEN, M.D.,
JAMES C. WILSON, M.D.,
OLIVER P. REX, M.D.,
W. W. VANVALZAH, M.D.

Gynæcologists.

F. H. GETCHELL, M.D.,
J. EWING MEARS, M.D.

Pathologist.

MORRIS LONGSTRETH, M.D.

F E E S.

Matriculation Fee (paid once).....	\$5 00	Practical Anatomy.....	\$10 00
Ticket of each Professor (7) \$20.....	140 00	Graduation Fee.....	30 00
Fees for a full course of Lectures to those who have attended two full courses at other (recognized) Colleges—the matriculation fee, and			
To Graduates of less than three years of such Colleges—the matriculation fee, and 50 00			
To Graduates of three years, and upwards, of such Colleges—the matriculation fee only.			

The Annual Announcement, giving full particulars, will be sent on application to
ELLERSLIE WALLACE, Dean.

Graduates who may see this notice will confer a great favor by sending to the Dean a postal card with the correct names and residences of themselves, and of other graduates in their vicinity, to whom announcements may be sent.

UNIVERSITY OF THE CITY OF NEW YORK. MEDICAL DEPARTMENT.

410 East Twenty-Sixth St., opposite Bellevue Hospital, New York.

FORTY-FIRST SESSION—1881-82.

FACULTY OF MEDICINE.

- REV. HOWARD CROSBY, M.D., LL.D., Chancellor of the University.
 ALFRED C. POST, M.D., LL.D., Emeritus Professor of Clinical Surgery; President of the Faculty.
 CHARLES INSLEE PARDEE, M.D., Professor of Otolaryngology; Dean of the Faculty.
 JOHN C. DRAPER, M.D., LL.D., Professor of Chemistry.
 ALFRED L. LOOMIS, M.D., Professor of Pathology and Practice of Medicine.
 WILLIAM DARLING, A.M., M.D., LL.D., F.R.C.S., Professor of General and Descriptive Anatomy.
 WILLIAM H. THOMSON, M.D., Professor of Materia Medica and Therapeutics.
 J. W. S. ARNOLD, M.D., Professor of Physiology and Histology.
 J. WILLISTON WRIGHT, M.D., Professor of Surgery.
 WM. M. POLK, M.D., Professor of Obstetrics and Diseases of Women and Children.
 FANEUIL D. WEISSE, M.D., Professor of Practical and Surgical Anatomy.
 LEWIS A. STIMSON, M.D., Professor of Pathological Anatomy.
 R. A. WITTHAUS, M.D., Professor of Physiological Chemistry.
 A. L. RANNEY, M.D., Adjunct Professor of Anatomy.
 JOSEPH E. WINTERS, M.D., Demonstrator of Anatomy.
 D. B. ST. JOHN ROOSA, M.D., Professor of Ophthalmology.
 WM. A. HAMMOND, M.D., Surgeon-General, U. S. A. (Retired), Professor of Diseases of the Mind and Nervous System.
 STEPHEN SMITH, M.D., Professor of Orthopædic Surgery.
 J. W. S. GOULEY, M.D., Professor of Diseases of the Genito-Urinary System.
 MONTROSE A. PALLAN, M.D., LL.D., Professor of Gynecology.
 HENRY G. PIFFARD, M.D., Professor of Dermatology.
 A. E. MACDONALD, M.D., Professor of Medical Jurisprudence.
 JAMES L. LITTLE, M.D., Professor of Clinical Surgery.
 F. R. STURGIS, M.D., Professor of Venereal Diseases.

THE COLLEGIATE YEAR is divided into three Sessions: a Preliminary Session, a Regular Winter Session, and a Spring Session.

THE PRELIMINARY SESSION will commence September 21, 1881, and will continue until the opening of the Regular Winter Session. It will be conducted on the plan of that Session.

THE REGULAR WINTER SESSION will commence on October 5, 1881, and end about the 1st of March, 1882.

The location of the new College edifice being immediately opposite the gate of Bellevue Hospital, and a few steps from the ferry to Charity Hospital, Blackwell's Island, the Students of the University Medical College are enabled to enjoy the advantages afforded by these Hospitals, with the least possible loss of time. The Professors of the practical Chairs are connected with the Hospitals, and the University Students are admitted to *all the Clinics* given therein *free of charge*.

In addition to the daily Hospital Clinics, there are eight Clinics each week in the College Building. Five Didactic Lectures will be given daily in the College building, and Evening Recitations will be conducted by the Professors of Chemistry, Practice, Anatomy, Materia Medica, etc., Physiology, Surgery, and Obstetrics, upon the subjects of their Lectures.

THE SPRING SESSION embraces a period of ten weeks, beginning in the first week of March and ending the last week of May. The daily Clinics, Recitations, and Special Practical Courses will be the same as in the Winter Session, and there will be Lectures on Special Subjects by the Members of the Faculty.

THE DISSECTING ROOM is open throughout the entire Collegiate year; material is abundant, and it is furnished free of charge.

STUDENTS WHO HAVE STUDIED TWO YEARS, and who have attended two full courses of lectures, may be admitted to examination in Chemistry, Anatomy, and Physiology, and, if successful, will be examined at the expiration of their full course of study on Practice, Materia Medica and Therapeutics, Surgery, and Obstetrics; but those who prefer it may have all their examinations at the close of their full term.

F E E S.

For Course of Lectures	\$140 00
Matriculation	5 00
Demonstrator's fee, including material for dissection	10 00
Graduation fee	30 00

For further particulars and circulars address the Dean,

Prof. CHAS. INSLEE PARDEE, M.D.,
University Medical College, 410 East 26th St., New York.

HARVARD UNIVERSITY.

MEDICAL DEPARTMENT, BOSTON, MASS.

NINETY-NINTH ANNUAL ANNOUNCEMENT (1881-82).

FACULTY.

CHARLES W. ELIOT, LL.D., President.
 CALVIN ELLIS, M.D., Dean, and Jackson Professor of Clinical Medicine.
 OLIVER W. HOLMES, M.D., LL.D., Parkman Professor of Anatomy.
 HENRY J. BIGELOW, M.D., Professor of Surgery.
 FRANCIS MINOT, M.D., Hersey Professor of the Theory and Practice of Physic.
 JOHN P. REYNOLDS, M.D., Professor of Obstetrics.
 HENRY W. WILLIAMS, M.D., Professor of Ophthalmology.
 DAVID W. CHEEVER, M.D., Professor of Clinical Surgery.
 JAMES C. WHITE, M.D., Professor of Dermatology.
 ROBERT T. EDES, M.D., Professor of Materia Medica.
 HENRY P. BOWDITCH, M.D., Professor of Physiology.
 FREDERICK I. KNIGHT, M.D., Instructor in Laryngoscopy.
 CHARLES B. PORTER, M.D., Instructor in Surgery.
 J. COLLINS WARREN, M.D., Instructor in Surgery.
 REGINALD H. FITZ, M.D., Shattuck Professor of Pathological Anatomy.
 WILLIAM L. RICHARDSON, M.D., Instructor in Obstetrics.
 THOMAS DWIGHT, M.D., Instructor in Topographical Anatomy and Histology.
 EDWARD S. WOOD, M.D., Professor of Chemistry.
 HENRY H. A. BEACH, M.D., Demonstrator of Anatomy.
 WILLIAM H. BAKER, M.D., Instructor in Gynæcology.
 WILLIAM B. HILLS, M.D., Instructor in Chemistry.
 WILLIAM F. WHITNEY, M.D., Curator of the Anatomical Museum.

OTHER INSTRUCTORS.

FRANK W. DRAPER, M.D., Lecturer on Forensic Medicine.
 CHARLES F. FOLSOM, M.D., Lecturer on Mental Diseases.
 HENRY P. QUINCY, M.D., Assistant in Histology.
 AMOS L. MASON, M.D., Assistant in Clinical Medicine.
 THOMAS WATERMAN, M.D., Assistant in Anatomy.
 EDWARD N. WHITTIER, M.D., Assistant in Clinical Medicine.
 WILLIAM P. BOLLES, M.D., Instructor in Materia Medica.
 ELBRIDGE G. CUTLER, M.D., Assistant in Pathological Anatomy.
 FREDERICK C. SHATTUCK, M.D., Assistant in Clinical Medicine.
 W. STURGIS BIGELOW, M.D., Assistant in Surgery.
 GEORGE M. GARLAND, M.D., Assistant in Physiology.
 MAURICE H. RICHARDSON, M.D., Assistant in Anatomy.
 CHARLES S. MINOT, S.D., Lecturer on Embryology.
 WILLIAM C. EMERSON, M.D., Assistant in Chemistry.
 W. J. OTIS, M.D., Prosector in Surgical Anatomy.

The following gentlemen will give special clinical instruction:—

FRANCIS B. GREENOUGH, M.D., and EDWARD WIGGLESWORTH, M.D., in Syphilis.
 J. ORNE GREEN, M.D., and CLARENCE J. BLAKE, M.D., in Otology.
 JOSEPH P. OLIVER, M.D., and THOMAS M. ROTCH, M.D., in Diseases of Children.
 SAMUEL C. WEBBER, M.D., and JAMES J. PUTNAM, M.D., in Diseases of the Nervous System.
 JAMES R. CHADWICK, M.D., in Diseases of Women.
 T. B. CURTIS, M.D., in Diseases of the Urinary Organs.
 E. H. BRADFORD, M.D., in Orthopedic Surgery.
 O. F. WADSWORTH, M.D., in Ophthalmoscopy.

All candidates for admission who hold no degree in arts or science, must pass a written examination on entrance to this School, in English, Latin, Physics, and any one of the following subjects: French, German, Elements of Algebra or of Plane Geometry, Botany. The admission examination for 1881-82 will be held June 27, at Boston, Chicago, and Cincinnati; on September 26th, at Boston only. The requirements are as stated in the Catalogue.

Instruction is given by lectures, recitations, clinical teaching, and practical exercises, distributed throughout the academic year. In the subjects of anatomy, histology, chemistry, and pathological

anatomy, laboratory work is largely substituted for, or added to, the usual methods of instruction. The year begins September 29, 1881, and ends on the last Wednesday in June, 1882. It is divided into two equal terms, either of which is more than equivalent to the former "Winter Session," as regards the amount and character of the instruction.

The course of study recommended by the Faculty covers four years, but until further notice the degree of Doctor of Medicine will continue to be given upon the completion of three years of study, to be as ample and full as heretofore. The degree of Doctor of Medicine *cum laude* will be given to candidates who have pursued a complete four years' course, and obtained an average of 75 per cent. upon all the examinations of this course. In addition to the ordinary degree of Doctor of Medicine as heretofore obtained, a certificate of attendance on the studies of the fourth year will be given to such students desiring it as shall have attended the course, and have passed a satisfactory examination in the studies of the same.

ORDER OF STUDIES AND EXAMINATIONS.

FOUR YEARS' COURSE.

For the First Year.—Anatomy, Physiology, and General Chemistry.

For the Second Year.—Practical and Topographical Anatomy, Medical Chemistry, Materia Medica, Pathological Anatomy, Clinical Medicine, Surgery, and Clinical Surgery.

For the Third Year.—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery, and Clinical Surgery.

For the Fourth Year.—Ophthalmology, Otology, Dermatology, Syphilis, Laryngology, Mental Diseases, Diseases of the Nervous System, Diseases of Women, Diseases of Children, Obstetrics, Clinical and Operative Obstetrics, Clinical Medicine, Clinical and Operative Surgery, Hygiene, Forensic Medicine.

Students are divided into four classes, according to their time of study and proficiency, and during their last year will receive largely increased opportunities of instruction in the special branches mentioned. Students who began their professional studies elsewhere may be admitted to advanced standing; but all persons who apply for admission to the advanced classes must pass an examination in the branches already pursued by the class to which they seek admission. The examinations are held in the following order:—

At the end of the first year—Anatomy, Physiology, and General Chemistry.

End of second year—Topographical Anatomy, Medical Chemistry, Materia Medica, and Pathological Anatomy.

End of third year—Therapeutics, Obstetrics, Theory and Practice of Medicine, Surgery.

End of fourth year—Ophthalmology, Otology, Dermatology, Syphilis, Laryngology, Mental Diseases, Diseases of the Nervous System, Diseases of Women, Diseases of Children, Obstetrics, Clinical and Operative Obstetrics, Clinical Medicine, Clinical and Operative Surgery, Hygiene, Forensic Medicine.

THREE YEARS' COURSE.

For the First Year.—Anatomy, Physiology, and General Chemistry.

For the Second Year.—Practical and Topographical Anatomy, Medical Chemistry, Materia Medica, Pathological Anatomy, Clinical Medicine, and Clinical Surgery.

For the Third Year.—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery, Clinical Surgery, Ophthalmology, Dermatology, Syphilis, Otology, Laryngology, Mental Diseases, Diseases of the Nervous System, Diseases of Women, Diseases of Children, Hygiene, Forensic Medicine.

Students following this course are classified as heretofore, and the instruction in the special branches is of the same character as that which has been given for several years. The examinations of the first two years are common to both groups of students. The final examinations at the close of the third year are in the following subjects: Therapeutics, Obstetrics, Surgery and Clinical Surgery, Theory and Practice, Clinical Medicine.

Examinations in all subjects are also held before the opening of the School, beginning September 26th.

REQUIREMENTS FOR A DEGREE.—Every candidate must be twenty-one years of age; must have studied medicine three or four full years, have spent at least one continuous year at this school, have passed a written examination upon all the prescribed studies of the course taken, and have presented a thesis.

COURSE FOR GRADUATES.—For the purpose of affording to those already Graduates of Medicine additional facilities for pursuing clinical, laboratory, and other studies, in such subjects as may specially interest them, the Faculty has established a course which comprises, in addition to the list of special departments above stated, the following branches: Histology; Physiology; Medical Chemistry; Pathological Anatomy. On payment of the full fee the privilege of attending any of the other exercises of the Medical School, the use of the laboratories and library, and all other rights accorded by the University will be granted. Single branches may also be pursued. Graduates of other Medical Schools who may desire to obtain the degree of M.D. at this University, will be admitted to examination for this degree after a year's study in the Graduates' Course. Examination on entrance not required.

FEES.—For Matriculation, \$5; for the Year, \$200; for one Term alone, \$120; for Graduation, \$30. For Graduates' Course, the fee for one year is \$200; for one Term, \$120; and for single courses such fees as are specified in the Catalogue. Payment in advance.

Members of any one department of Harvard University have a right to attend lectures and recitations in any other department without paying additional fees.

For further information, or Catalogue, address

DR. R. H. FITZ, *Secretary*,
18 Arlington St., Boston, Mass.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF LOUISIANA—NEW ORLEANS.

FACULTY.

- T. G. RICHARDSON, M.D., Professor of General and Clinical Surgery.
 SAMUEL M. BENISS, M.D., Professor of the Theory and Practice of Medicine and Clinical Medicine.
 STANFORD E. CHAILLÉ, M.D., Professor of Physiology and Pathological Anatomy.
 JOSEPH JONES, M.D., Professor of Chemistry and Clinical Medicine.
 SAMUEL LOGAN, M.D., Professor of Anatomy and Clinical Surgery.
 ERNEST S. LEWIS, M.D., Professor of General and Clinical Obstetrics and Diseases of Women and Children.
 JOHN B. ELLIOTT, M.D., Professor of Materia Medica and Therapeutics, and Hygiene.
 ALBERT B. MILES, Demonstrator of Anatomy.

The next annual course of instruction in this Department (now in the forty-eighth year of its existence) will commence on Monday, the 17th day of October, 1881, and terminate on Saturday, the 25th day of March, 1882. The first three weeks of the term will be devoted exclusively to Clinical Medicine and Surgery at the Charity Hospital; Practical Chemistry in the Laboratory; and dissections in the spacious and airy Anatomical Rooms of the University.

The means of teaching now at the command of the Faculty are unsurpassed in the United States. Special attention is called to the opportunities presented for

CLINICAL INSTRUCTION.

The Act establishing the University of Louisiana gives the Professors of the Medical Department the use of the great Charity Hospital as a school of practical instruction.

The Charity Hospital contains nearly 700 beds, and received, during the last year, more than six thousand patients. Its advantages for professional study are unsurpassed by any similar institution in this country. The Medical, Surgical, and Obstetrical Wards are visited by the respective professors in charge daily, from eight to ten o'clock A. M., at which time all the students are expected to attend and familiarize themselves, *at the bedside of the patients*, with the diagnosis and treatment of all forms of injury and disease.

The regular lectures at the hospital, on Clinical Medicine by Professors Bemiss and Joseph Jones, Surgery by Professors Richardson and Logan, Diseases of Women and Children by Professor Lewis, and Special Pathological Anatomy by Professor Chaillé, will be delivered in the amphitheatre on Monday, Wednesday, Thursday, and Saturday, from 10 to 12 o'clock A. M.

The administrators of the hospital elect annually, by competitive examinations, *fourteen resident students*, who are maintained by the institution.

TERMS.

For the Tickets of all the Professors	\$140 00
For the Ticket of Practical Anatomy	10 00
Matriculation Fee	5 00
Graduation Fee	30 00

Candidates for graduation are required to be twenty-one years of age; to have studied three years; to have attended two courses of lectures, and to pass a satisfactory examination.

Graduates of other respectable schools are admitted upon payment of the Matriculation and half lecture fees. They cannot, however, obtain the Diploma of the University without passing the regular examinations and paying the usual Graduation Fee.

As the practical advantages here afforded for a thorough acquaintance with all the branches of medicine and surgery are *quite equal* to those possessed by the schools of New York and Philadelphia, the same fees are charged.

For further information, address

T. G. RICHARDSON, M.D., *Dean*.

CHICAGO MEDICAL COLLEGE.

MEDICAL DEPARTMENT OF THE NORTHWESTERN UNIVERSITY.

SESSIONS OF 1881-2.

H. A. JOHNSON, A.M., M.D.,
Emeritus Professor of the Principles and
Practice of Medicine.

N. S. DAVIS, M.D., LL.D., DEAN,
Professor of Principles and Practice of
Medicine and of Clinical Medicine.

EDMUND ANDREWS, A.M., M.D.,
Professor of Clinical Surgery.

RALPH N. ISHAM, M.D.,
Professor of Principles and Practice of
Surgery.

EDWARD W. JENKS, M.D., LL.D.,
Professor of Medical and Surgical Diseases
of Women and of Clinical Gynecology.

E. O. F. ROLER, A.M., M.D.,
Professor of Obstetrics and Diseases of
Children.

SAMUEL J. JONES, A.M., M.D.,
Professor of Ophthalmology and Otolary.

J. H. HOLLISTER, M.D.,
Prof. of General Pathology and Patho-
logical Anatomy.

J. S. JEWELL, A.M., M.D.,
Professor of Nervous and Mental Diseases.

WM. E. QUINE, M.D.,
Professor of Materia Medica, General
Therapeutics and Hygiene.

MARCUS P. HATFIELD, A.M., M.D.,
Professor of Chemistry and Medical
Jurisprudence

LISTER CURTIS, A.M., M.D.,
Professor of Histology.

R. L. REA, M.D.,
Professor of Anatomy.

HENRY GRADLE, M.D.,
Professor of Physiology.

ROSWELL PARK, A.M., M.D.,
Demonstrator of Anatomy.

The Collegiate Year in this Institution consists of a REGULAR AUTUMN AND WINTER SESSION, a special SESSION FOR PRACTITIONERS, and a SPRING SESSION. THE REGULAR SESSION begins September 27, 1881, and closes March 28, 1882.

This College was the first in the United States to adopt a graded system of instruction. All applicants for admission must possess at least a good English education, and present full evidence of the same. If an applicant has received the degree of A. B., or presents a certificate from some reputable Scientific School, High School, or Academy, no matriculation examination will be required; otherwise he must sustain a satisfactory examination before a committee of the Faculty. The students are divided into 1st YEAR, 2d YEAR, and 3d YEAR CLASSES, instructions being given simultaneously in different lecture rooms. All students are advised to pursue the three years' graded course, but if students so elect, they can enter the 2d Year's Course if they have studied medicine for one year previously, and can sustain a satisfactory examination upon the studies embraced in the 1st Year's Course.

The Clinical advantages of this College, with the great number of Dispensary, College Clinic and Hospital patients, cannot be surpassed. All professors of practical branches are members of the staff of Mercy or Cook County Hospital, or other charities. Students receive instruction, by the Faculty or Assistants, *without extra charge*, in those special branches which in some Institutions are considered as the perquisites of private teachers, for which additional fees are required (such as Gynecology, Ophthalmology, Otolary, Laryngology, Physical Diagnosis, etc.). For several sessions each senior student has had the privilege of attending upon one or more obstetrical cases, and of witnessing important obstetrical operations.

It is the aim of the Faculty to make all instruction in the College pre-eminently practical

THE PRACTITIONERS' COURSE, designed for Practising Physicians only, was inaugurated in 1879. It has proven so satisfactory to all concerned that it will be continued and constitute a portion of each Collegiate year. This course will begin the day following the public Commencement exercises, and continue for four weeks, affording, by means of didactic and daily clinical instruction, special advantages to physicians for a rapid, yet thorough, practical review of the most important subjects in Medicine and Surgery. The SPRING SESSION consists of Recitations, Laboratory and Dispensary work, and Clinical and Didactic Lectures, beginning April 1, 1882, and closing June 1, 1882.

FEES FOR COLLEGIATE YEAR (except Practitioners' Course), \$75. Registration Fee, \$5. Demonstrator's Ticket, \$5. Laboratory Ticket, \$5. Mercy Hospital Ticket, \$6. Final Examination Fee, \$30. For Practitioners' Course, including Laboratory, Anatomical, and Hospital Tickets, \$30.

For the Annual Announcement and Catalogue, or for any information relating to the College, address

N. S. DAVIS, M.D., LL.D., DEAN,
65 Randolph St., Chicago.

BOYLSTON MEDICAL PRIZE QUESTIONS:

The Boylston Medical Committee, appointed by the President and Fellows of Harvard University, consists of the following Physicians:—

D. H. STORER, M.D.
MORRILL WYMAN, M.D.

HENRY J. BIGELOW, M.D.
RICHARD M. HODGES, M.D.

CALVIN ELLIS, M.D.
SAMUEL CABOT, M.D.

At the annual meeting, held June 1, 1881, it was voted that a prize of three hundred dollars be awarded to Herbert W. Page, F.R.C.S., Assistant Surgeon of St. Mary's Hospital, London, for a dissertation on "Injuries to the Back, without apparent Mechanical Lesion, in their Surgical and Medico-Legal Aspects."

No prize was awarded to any dissertation on the first subject proposed for 1881.

The following are the questions proposed for 1882:—

I. Sewer Gas, so-called (the gas found in Sewers): What are its Physiological and Pathological Effects on Animals and Plants? An Experimental Inquiry.

The author of a dissertation on the above subject, considered worthy of a prize, will be entitled to a premium of Three Hundred Dollars.

II. The Therapeutic Value of Food, administered against, or beyond, the Patient's Appetite and Inclination.

The author of a dissertation on the above subject, considered worthy of a prize, will be entitled to a premium of Two Hundred Dollars.

Dissertations on the above subjects must be transmitted, post paid, to D. H. Storer, M.D., 182 Boylston Street, Massachusetts, on or before the first Wednesday in April, 1882.

The following are the questions proposed for 1883:—

I. Measles; German Measles; and their Counterfeits.

II. The Differential Diagnosis of Abdominal Tumours; especially those connected with the Genito-Urinary Organs.

The author of a dissertation, considered worthy of a prize, on either of the subjects proposed for 1883, will be entitled to a premium of Two Hundred Dollars.

Dissertations on these subjects must be transmitted as above, on or before the first Wednesday in April, 1883.

Each dissertation must be accompanied by a sealed packet on which shall be written some device or sentence, and within which shall be inclosed the author's name and residence. The same device or sentence is to be written on the dissertation to which the packet is attached.

The writer of each dissertation is expected to transmit his communication to the President of the Committee, D. H. Storer, M.D., 182 Boylston St., Boston, Massachusetts, in a distinct and plain handwriting, and with the pages bound in book form, within the time specified.

Any *et-cu* by which the authorship of a dissertation is made known to the Committee will *debar* such dissertation from competition.

Preference will be given to dissertations which exhibit original work.

All unsuccessful dissertations are deposited with the Secretary, from whom they may be obtained, with the sealed packet unopened, if called for within one year after they have been received.

By an order adopted in 1826, the Secretary was directed to publish annually the following votes:—

1st. That the Board do not consider themselves as approving the doctrines contained in any of the dissertations to which premiums may be adjudged.

2d. That in case of publication of a successful dissertation, the author be considered as bound to print the above vote in connection therewith.

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THE REGULAR WINTER SESSION will begin Oct. 1, 1881, and continue five months.

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FOR OCTOBER 1881.

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ALL communications intended for insertion in the Original Department of this Journal are only received for consideration with the distinct understanding that they are sent for publication to this Journal alone, and that abstracts of them shall only appear elsewhere subsequently, and with due credit. Gentlemen favouring us with their communications are considered to be bound in honour to a strict observance of this understanding.

Contributors who wish their articles to appear in the next number are requested to forward them before the 1st of November.

Liberal compensation is made for all articles used. Extra copies, in pamphlet form with cover, will be furnished to authors in lieu of compensation, *provided the request for them be made at the time the communication is sent to the Editor.*

The following works have been received :—

Ueber rhinoscopisches Operiren. Von Dr. ARTHUR HARTMANN, in Berlin.
Die Wirkungen den Quebrachodroguen. Von Dr. F. PENZOLDT. Erlangen, 1881.
Ueber den Befund einer Excessbildung an der Trachea eines 41 jährigen Mannes. Von Dr. JOHN N. MACKENZIE, aus Baltimore.

Contribution a la Thérapeutique Chirurgicale des Fistules Vésico-Vaginales. Par le Dr. CAZIN. Paris, 1881.

Des Intermittences du Poulos, de la Syncope, et de la Inert Subite dans la Convalescence de la Fièvre Typhoïde. Par le Dr. LANGLET. Reims, 1881.

Des Tubercules de l'Estomac spécialement chez les Enfants. Par le Dr. H. CAZIN. Paris, 1881.

A Case of Abscess of the Liver; Aspiration; Recovery. By GEORGE F. DUFFEY. M.D., Dubl. Dublin, 1881.

The Means of Determining Causation in Insanity. By WM. R. HUGGARD, M.D.

Transactions of the Liverpool Medical Institution. Session 1880-1881. Inaugural Address. By REGINALD HARRISON, M.D.

On Functional Murmur in the Pulmonary Artery. By C. J. NIXON, M.D. Dublin, 1881.

A Case of Battey's Operation. By ISAIAH DE ZOUCHÉ, M.D.

Report of the Medical Missionary Society in China, 1880. Hong Kong, 1881.

A Treatise on Comparative Embryology. By FRANCIS M. BALFOUR, LL.D., F.R.S. In two vols. London: Macmillan & Co., 1881.

The Hunterian Oration delivered at the Royal College of Surgeons of England on the 14th of February, 1881. By LUTHER HOLDEN. London: J. & A. Churchill, 1881.

Rheumatism, its Nature, its Pathology, and its Successful Treatment. By T. J. MACLAGAN, M.D. London: Pickering & Co., 1881.

Jones' Chemical Vade Mecum for Medical Students. By GEORGE JONES, F.C.S. London: Henry Kempton, 1881.

The Harrogate Waters. Data, Chemical and Therapeutical, with Notes on the Climate of Harrogate. By GEORGE OLIVER, M.D. Lond. London: H. K. Lewis, 1881.

A System of Surgery, Theoretical and Practical, in Treatises by Various Authors. Edited by T. HOLMES, M.A., Cantab. First American from Second English Edition. Thoroughly revised and much enlarged by JOHN H. PACKARD, A.M., M.D., assisted by a large Corps of the Most Eminent American Surgeons. In three volumes. Vol. I. General Pathology, Morbid Processes, Injuries in General, Complications by Injuries. Injuries of Regions. Philadelphia: Henry C. Lea's Son & Co., 1881.

Landmarks, Medical and Surgical. By LUTHER HOLDEN, assisted by JAMES SHUTER, M.A., Camb. From the 3d English Ed., with Additions by WILLIAM W. KEEN, M.D. Philadelphia: Henry C. Lea's Son & Co., 1881.

A Practical Treatise on Impotence, Sterility, and Allied Disorders of the Male Sexual Organs. By SAMUEL W. GROSS, A.M., M.D. With Sixteen Illustrations. Philadelphia: Henry C. Lea's Son & Co., 1881.

The Mother's Guide in the Management and Feeding of Infants. By JOHN M. KEATING, M.D. Philadelphia: Henry C. Lea's Son & Co., 1881.

Text-Book of Modern Midwifery. By RODNEY GLISAN, M.D., Emeritus Prof. of Obstetrics in Willamette Univ., Oregon. Philadelphia: Presley Blakiston, 1881.

Chemical Analysis of the Urine, based in part on Casselmann's Analyse des Harns. By EDGAR F. SMITH, Ph. D., and JOHN MARSHALL, M.D. Philadelphia: Presley Blakiston, 1881.

On Cancer, Its Allies, and Other Tumours, with Special Reference to their Medical and Surgical Treatment. By F. ALBERT PURCELL, M.D., M.R.C.S. Philadelphia: Presley Blakiston, 1881.

Deformities of the Mouth, Congenital and Acquired, with their Mechanical Treatment. By OAKLEY COLES. Third Edition. Philadelphia: Presley Blakiston, 1881.

Manual for the Physiological Laboratory. By VINCENT HARRIS, M.D. Lond., and D'ARCY POWER, B.A. Oxon. New York: William Wood & Co., 1881.

Lectures on Digestion: an Introduction to the Clinical Study of Diseases of the Digestive Organs. By Dr. C. A. EWALD. Translated by ROBERT SAUNDBY, M.D. Edin. New York: William Wood & Co., 1881.

The Wilderness Cure. By MARC COOK. New York: William Wood & Co., 1881.

A Manual of Histology. Edited and Prepared by THOMAS E. SATTERTHWAIT, M.D., of New York. New York: Wm. Wood & Co., 1881.

A Treatise on the Diseases of the Nervous System. By JAMES ROSS, M.D., M.R.C.P. Lond. 2 vols. New York: Wm. Wood & Co., 1881.

Lectures on the Diagnosis and Treatment of Diseases of the Chest, Throat, and Nasal Cavities. By E. FLETCHER INGALLS, M.D., Lect. on Dis. of Chest, etc., Rush Med. College. New York: Wm. Wood & Co., 1881.

Supplement to Ziemssen's Cyclopedia of the Practice of Medicine. Edited by GEORGE L. PEABODY, M.D. New York: Wm. Wood & Co., 1881.

Lectures on the Surgical Disorders of the Urinary Organs. By REGINALD HARRISON, F.R.C.S., Surgeon to the Liverpool Royal Infirmary. Second Ed. Considerably enlarged. New York: Wm. Wood & Co., 1881.

Cyclopædia of the Practice of Medicine. Edited by Dr. H. VON ZIEMSEN. Vol. XX. General Index. New York: Wm. Wood & Co., 1881.

General Medical Chemistry for the Use of Practitioners of Medicine. By R. A. WITTHAUS, M.D., Prof. of Chem. in Univ. of Vt. New York: Wm. Wood & Co., 1881.

The Prescriber's Memoranda. New York: Wm. Wood & Co., 1881.

Minor Surgical Gynecology, a Manual of Uterine Diagnosis and the lesser technicalities of Gynecological Practice for the use of the Advanced Student and General Practitioner. By PAUL F. MUNDE, M.D., etc. New York: Wm. Wood & Co., 1880.

A Medical Formulary based on the United States and British Pharmacopœias, together with numerous French, German, and Unofficial Preparations. By LAURENCE JOHNSON, A.M., M.D. New York: Wm. Wood & Co., 1881.

Clinical Lectures on Diseases of Old Age. By J. M. CHARCOT, M.D. Translated by L. H. HUNT, M.D. With Additional Lectures by ALFRED L. LOOMIS, M.D. New York: Wm. Wood & Co., 1881.

Coulson on the Diseases of the Bladder and Prostate Gland. 6th Ed. Revised by WALTER J. COULSON. New York: Wm. Wood & Co., 1881.

Habitual Mouth Breathing. Its Causes, Effects, and Treatment. By CLINTON WAGNER, M.D. New York: G. P. Putnam's Sons, 1881.

Hygiene and Treatment of Catarrh. Therapeutic and Operative Measures for Chronic Catarrhal Inflammation of the Nose, Throat, and Ears. Part II. By THOS. F. RUMBOLD, M.D. St. Louis: Geo. O. Rumbold & Co., 1881.

The Compend of Anatomy for Use in the Dissecting Room and in Preparing for Examinations. By JOHN B. ROBERTS, M.D. Second Edition, revised. Philadelphia: G. C. Roberts & Co., 1881.

Antiseptic Surgery. The Principles, Modes of Application, and Results of the Lister Dressing. By Dr. JUST LUCAS-CHAMPIONNIERE. Translated from the second and completely revised edition, by FRED'K HENRY GERRISH, A.M., M.D. Portland: Loring, Short & Harmon, 1881.

Index-Catalogue of the Library of the Surgeon-General's Office, United States Army. Authors and Subjects. Vol. II. BERLIOZ—CHOLAS. Washington: Gov't Printing Office, 1881.

The Disposal of the Dead. A Plea for Cremation. By EDWARD J. BERMINGHAM, A.M., M.D. New York: Bermingham & Co., 1881.

Treatment of Varicocele by Excision of Redundant Scrotum. By M. H. HENRY, M.D. New York: J. H. Vail & Co., 1881.

The Remedial Properties of the Hot Springs, Ark. By CHAS. H. LOTHROP, M.D., Lyons, Iowa.

Abortive Treatment of Pneumonia. By W. T. GADBURY, M.D., of Yazoo City.

On Eye Affections from Malarial Poisoning. By CHARLES J. KIPP, M.D. Newark. Hydrocele in the Female. By WILLIAM C. WILE, M.D. New York, 1881.

Sub-hyoidean Pharyngotomy for the Removal of the Epiglottis for Epithelioma, with Illustrative Case. By CLINTON E. WAGNER, M.D. New York, 1881.

Glaucoma caused by Mental Worry. By LEARTUS CONNOR, M.D. Detroit, 1881.

Importance of the Early Recognition of Epilepsy. A Second Contribution to the Study of Localized Cerebral Lesions. By E. C. SEGUIN, M.D. New York, 1881.

Uterine Dilatation with a new Instrument. By H. P. C. WILSON, M.D., of Baltimore. New York, 1881.

- Pleural Effusion with Special Reference to Pyo-Thorax. By ALEX. N. DOUGHERTY, M.D. Newark, 1881.
- Post-Partum Atrophy of the Uterus. By WALTER COLES, M.D. St. Louis, 1881.
- On the Surgical Anatomy of the Sheaths of the Palmar Tendon. By ROSWELL PARK, M.D. Brooklyn, 1881.
- Observations with the Hæmacytometer upon the Globular Composition of the Blood and Milk. By FREDERICK P. HENRY, M.D. Philadelphia: F. A. Davis, Att'y, 1881.
- Medical Societies: Their Organization and the Nature of their Work. By J. COLLINS WARREN, M.D. Cambridge, 1881.
- Eadsport, Ship Island Quarantine, and National Board of Health. New Orleans, 1881.
- The Opium Habit. By CHARLES WARRINGTON EARLE, M.D. Chicago, 1880.
- Stenosis of the Larynx. By W. H. DALY, M.D.
- Tubercular Laryngitis. By C. J. LUNDY, M.D.
- The Question of Axillary or Ischiatic Support in the Treatment of the Lower Extremity. By A. B. JUDSON, M.D. New York, 1881.
- An Essay on Antiseptic Surgery. By G. W. GUTHRIE, M.D. Wilkesbarre, 1881.
- The Pathology and Surgical Treatment of Hypertrophic Nasal Catarrh. By WM. C. JARVIS, M.D. New York, 1881.
- Ether Death. By JOHN B. ROBERTS, M.D.
- Indigenous Malarial Diseases of Wyoming Valley. By JOHN B. CRAWFORD, M.D. Wilkesbarre, 1881.
- The Management of Wounds. By DAVID PRINCE, M.D. Philadelphia.
- A Clinical Contribution to the Study of Post-Paralytic Chorea. A Contribution to the Study of Localized Cerebral Lesions. By E. C. SEGUIN, M.D. New York, 1877.
- Contribution to the Correction of Strabismus by the Advancement of the Rectus. By A. E. PRINCE, M.D. St. Louis, 1881.
- Hip-Joint Disease. Death in Early Stage from Tubercular Meningitis. By DE FORREST WILLARD, M.D. Microscopical Appearances. By E. O. SHAKEPEARE, M.D. Cambridge, 1881.
- Hip-Injuries, Including Hip-Joint Disease, and Fracture of the Femoral Neck. By DE F. WILLARD, M.D.
- Dengue. By J. G. THOMAS, M.D. Boston, 1881.
- Report of the Trial of J. T. Jarnette for Homicide. By EUGENE GRISSOM, M.D. Raleigh, N. C.
- Considerations respecting the Mechanical Treatment of Hip Disease, with especial reference to the Value of Fracture. By A. B. JUDSON, M.D., of New York.
- Ethylene Bichloride as an Anæsthetic Agent. Are all Anæsthetics Dangerous which contain Chlorine, Bromine, or Iodine? Convulsions due to Depression of Spinal Reflex-Inhibitory Centres. By EDWARD T. REICHERT, M.D.
- A Report of 20 Years' Experience in the Department of Physical Education and Hygiene in Amherst College. Amherst, 1881.
- The Quality of Mental Operations debased by the Use of Alcohol. By T. L. WRIGHT, M.D. St. Louis, 1881.
- Tenotomy in the Treatment of Congenital Club-Foot. By AP MORGAN VANCE, M.D. New York, 1881.
- Nasal Stenosis. By J. O. ROE, M.D. New York, 1881.
- Majority Report of Committee on the Subject of Lunacy Commissions in United States and Foreign Countries, their "History, Aims, and Results." Hartford, 1881.
- Female Diseases. By R. J. NUNN, M.D. Augusta, Ga., 1881.
- Progress in Medical Education. By J. ADAMS ALLEN, M.D. Chicago, 1881.
- Report of the Alumni Association, with the Exercises of the 60th Commencement of the Philadelphia College of Pharmacy. Philadelphia, 1881.
- Public Health Reports and Papers of the American Public Health Association. Vol. VI. Boston, 1881.
- Proceedings of the Connecticut State Medical Society, 1881. Hartford, 1881.
- Proceedings of the Academy of Natural Sciences of Philadelphia, Jan.-May, 1881.
- Transactions of the College of Physicians of Philadelphia. 3d Series. Vol. V.
- Proceedings of the Medical Society of the County of Kings. July, Aug., Sept., 1881.
- Transactions of the South Carolina Medical Association, 1881. Charleston, 1881.
- Transactions of the American Dermatological Association, 1880. Phila., 1881.
- Proceedings of the Nebraska State Medical Society, 9th to 12th Sessions. Omaha, 1880.
- Transactions of the Indiana State Medical Society. Indianapolis, 1881.
- Minutes of Annual Meeting of Kentucky State Medical Soc., 1881. Louisville, 1881.
- Minutes of Annual Meeting of Medical Society of North Carolina. Asheville, 1881.
- Report of the State Board of Health of the State of Rhode Island. Providence, 1881.
- Report of the Board of Health of the City of Boston. Boston, 1881.
- Report of the City Hospital, Boston, 1880-1. Boston, 1881.
- Report of the Pennsylvania Hospital. Philadelphia, 1881.
- Health Officer's Report on Births, Marriages, and Deaths for the City of Philadelphia, 1880. Philadelphia, 1881.
- Report on Hawaiian Leprosy. By A. W. SAXE, M.D. Santa Clara, 1881.

The following Journals have been received in exchange :—

Deutsches Archiv für Klinische Medicin, Bd. xxvii. Heft 5, to Bd. xxix. Heft 4.
 Medizinische Jahrlücher, 1880, Heft 4.
 Centralblatt für Medicinischen Wissenschaften, Nos. 49 to 36, 1881.
 Allgemeine Wiener Medizinische Zeitung, Nos. 48, 1880, to 35, 1881.
 Deutsche Medicinische Wochenschrift, Nos. 48, 1880, to 36, 1881.
 Medicinisch-Chirurgisches Centralblatt, Nos. 49, 1880, to 25, 1881.
 Bibliothek für Læger, Bd. xi. 1, 2, 3.
 Nordiskt Medicinskt Arkiv, 1880, Tredja, Häft., 1881, Andea Häftet.
 Upsala Läkarsällningens Förhandlingar, Bd. xvi., Nos. 2 to 8.
 Annali Universali di Medicina e Chirurgia, Nov. 1880, to Agosto, 1881.
 L'Imparziale, No. 23, 1880, to No. 16, 1881.
 Lo Spermiale, Dic. 1880, to Agosto, 1881.
 O Correio Medico de Lisboa, Nos. 22, 1880, to 14, 1881.
 Cronica Medico-Quirurgica de la Habana, Dic. 1880, to Julio, 1881.
 Revue des Sciences Médicales en France et de l'Etranger, Jan., Avril, Juillet, 1881.
 Archives Générales de Médecine, Jan. to Sept., 1881.
 Archives de Neurologie, T. 1, Nos. 4, 5.
 Revue de Médecine, Jan. to Aout, 1881.
 Annales de Dermatologie et de Syphiligraphie, Tome 11, Nos. 1, 2, 3.
 Annales de Gynécologie, Dec. 1880, to Aout, 1881.
 Annales des Maladies de l'Oreille et du Larynx, Tome vi. No. 6, vii. 1, 2, 3.
 Bulletin Générale de Théraputique, Dec. 1880, to Aout, 1881.
 L'Union Médicale, Nos. 157, 1880, to 121, 1881.
 Le Progrès Médical, Nos. 49, 1880, to 36, 1881.
 Gazette Médicale de Paris, Nos. 12 to 36, 1881.
 Union Médicale et Scientifique du Nord-Est, Dec. 1880, to Aout, 1881.
 Revue Internationale des Sciences Biologiques, Dec. 1880, to Aout, 1881.
 Revue Scientifique de la France et de l'Etranger, T. 27, Nos. 18 to T. 28, No. 10.
 The Retrospect of Medicine, July-Dec. 1880, Jan.-June, 1881.
 The Lancet, Jan. to Sept. 1881.
 The Medical Times and Gazette, Jan. to Sept. 1881.
 The British Medical Journal, Jan. to Sept. 1881.
 The London Medical Record, Dec. 1880, to Sept. 1881.
 The Practitioner, Jan. to Sept. 1881.
 Brain, Jan., April, July, 1881.
 The Journal of Anatomy and Physiology, Jan., April, July, 1881.
 The Journal of Physiology, vol. iii., Nos. 1, 2.
 Edinburgh Medical Journal, Jan. to Sept. 1881.
 The Glasgow Medical Journal, Jan. to Sept. 1881.
 The Dublin Journal of Medical Science, Dec. 1880, to Aug. 1881.
 Royal London Ophthalmic Hospital Reports, vol. x. part ii.
 The Australian Medical Journal, Nov. 1880, to June, 1881.
 Indian Medical Gazette, Dec. 1880, to Aug. 1881.
 The Liverpool Medico-Chirurgical Journal, including the Proceedings of the Liverpool Medical Institution, No. 1.

The usual American exchanges have been received ; their separate acknowledgment is omitted for want of space.

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OF

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THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR OCTOBER 1881.

ARTICLE I.

THE NERVOUS SYMPTOMS OF LITHÆMIA. By J. M. DA COSTA, M.D.,
Professor of Practice of Medicine and of Clinical Medicine at the Jefferson
Medical College, Philadelphia; Physician to the Pennsylvania Hospital.

AMONG the subjects which have been of late more clearly recognized is that of lithiasis or lithæmia. Able researches have done much, decidedly, to direct the attention of the medical mind to it, and the outcome is that it is now distinctly known that a state exists which is closely allied to gout, a half-gout that does not bring with it the inflammation, pain, and obvious swellings of the gouty paroxysm, but which works more silently, is characterized by the abundance of lithic acid or lithates in the urine, frequently coexists with signs of ill-assimilation of food, and with aches and pains unaccompanied by any perceptible changes of the aching part. Hepatic derangement is also often found; and from this end of the chain the links are stretched through many vague, almost nameless, symptoms to outbreaks of true gout, or to structural change in heart, vessels, and kidneys. But it is not my object to discuss this relationship, and the mode of progress, nor the striking organic changes that are wrought. I shall confine myself to the less obvious, less known results which show themselves in the nervous system. This matter has long engaged my attention, and the more I examine it, the more I see these obscure phenomena becoming clear and demonstrating for themselves their true causation.

The first nervous symptom, connected with lithæmia, that I shall describe is *vertigo*. It is astonishing how many cases of vertigo turn out, on close investigation, to be thus caused; how persistent are the symptoms, how grave the apprehensions, until their true source is made out and the treat-

ment based on it; and how gratifying then the results of the treatment. Cases go on for years, some of them weighted down with the suspicion of organic cerebral mischief, more especially of tumour of the brain; lives are wrecked by the enforced abandonment of pursuits; the remedies employed are hurtful rather than helpful, until the hidden cause of the malady is discerned and by steady perseverance removed.

I will, by way of illustration, record three such cases of grave aspect and long standing.

CASE I.—A physician, 35 years of age, practising in a malarial district, himself a malarial subject, but not for some time affected with any distinct malarial outbreak, consulted me for violent attacks of vertigo; so violent and repeated that they interfered with the exercise of his profession; often was he obliged to lie down in his carriage, and at times staggered so in going to a house that, leaning against the front door for support, he would fall into the entry when the door was opened. He was rarely a day without an attack, although some were light; at times they were twice or thrice repeated in the twenty-four hours. His memory began to fail him; he was especially confused as to names, and was liable to use wrong words like an aphasic. At times a dull headache existed, but headache was on the whole neither a constant nor a prominent symptom; his vision was less acute than formerly. These symptoms had been going on markedly for a year, uninfluenced by quinia and other remedies, which he at first took under the belief that the disorder was malarial. Efforts to continue his professional duties increased his distress. He finally abandoned work, fully persuaded that he had an organic disease of brain or spinal cord, and alternating only in opinion between cerebral tumour, as he thought of the violent vertigo and of the headache, and locomotor ataxia, as his mind dwelt on the uncertainty of gait and the attacks of shooting pains in the limbs which every now and then happened.

When examined by me, I found no alteration of sensibility or of motion; the tongue was slightly coated at the back, the bowels were regular; the conjunctiva rather muddy, and with the faintest yellowish tint; no marked dyspeptic symptoms existed, or enlargement of liver or spleen, though the liver dulness was, perhaps, a little more extended than normal. The pulse was compressible, and occasionally lost a beat; there was no cardiac murmur. The appearance of the patient was that of distress, but not of anæmia. The joints of the fingers were somewhat tender on pressure. The urine was scanty, of high specific gravity, free from albumen, but loaded with lithates.

It was difficult to persuade the patient that he was not affected with a hopeless disease; that his symptoms were those of lithæmia, produced by overwork and the disordered state of the liver due most likely to malarial poison. He yielded reluctantly to the view of trying a strict diet, resting from work, exercising in the open air, and using alkaline purgative waters, followed by a course of small doses of arsenic. But he was glad he had yielded when health slowly, but steadily and fully, returning showed him the advantage derived from his submission.

The case I am about to relate was of much longer duration, and the time that has elapsed since the last attack shows how complete was the recovery.

CASE II.—A gentleman, 48 years of age, fond of intellectual pursuits, and leading the life of a student in addition to bearing the cares and anxieties of the responsible direction of heavy interests, has been at least for twelve years subject to attacks of vertigo, which distress him and demoralize him. Some years since he never passed a month without them; they come, when feeling well, or with but little premonition, simply that of a slight dyspeptic state; they come when on a strain, and when taking relaxation, though much more generally under the former than under the latter circumstances. The attacks are of about a minute's duration; he has had them at night awakening him out of his sleep; they are objective, and followed by a dull headache, which does not last longer than a day and sometimes only for a few hours. He is very gloomy after them, and for years his life was haunted by the idea that he was becoming an epileptic. This view was seemingly confirmed by rapidly passing spells, during which his mind was a blank and he would stagger in his gait, and he eyed with keen suspicion any companion in his walk, fearing that the dreaded secret was at last disclosed. Irregularity of the heart I found to be very common with him, the pulse some days intermitting every fourth beat, and on others only every twentieth. When the irregularity was most marked, these passing attacks of oblivion happened most decidedly. The intellectual faculties were always acute, but long spells of listlessness, requiring strong will power to force himself into exertion, were not infrequent. Dyspepsia occurred occasionally, especially of the acid type, but was not a marked symptom; the urine often deposited lithates, was of specific gravity ranging from 1020 to 1024, was free from sugar and albumen, contained lithates in abundance, and at times oxalates. The eye ground, examined by an ophthalmologist, was pronounced to be normal; it is right to add that the examination was made when there had not recently been vertigo. Slight sallowness of the skin and elevation of temperature, not exceeding one degree, were occasional symptoms, and joints of right hand at times tender on pressure, pain in the toes, and so-called rheumatism in the leg, some stiffness in walking, were also at long intervals observed.

Lithæmia existed in the family; the father had clearly suffered from similar symptoms, including the vertigo; a brother had the uric acid diathesis very marked, and had passed renal calculi of uric acid.

A system of active exercise, shower baths, regulated diet, produced very good results, so good that the attacks of vertigo happened only once in seven or eight months, while the dreaded slight suspensions of consciousness passed away altogether. But the cure was completed by a European trip, and the taking, while in Europe, of a course of Kissingen water. Two years and a half have elapsed since the last vertiginous seizure, and although there are still occasionally lithæmic symptoms, as regards the pain in the joints, and their soreness on pressure, the nervous symptoms have vanished; the action of the heart has become quite regular, the future seems as bright and promising, as before it was overcast and gloomy.

In the cases just described, the symptoms of gastric derangement were so slight and inconstant that they scarcely can be said to have been features of the disorder. I will now cite one, remarkable also for its seeming gravity, in which, however, early in the case at least, gastric symptoms were marked.

CASE III.—A gentleman, 38 years of age, tall, of fine physique, of nervous temperament, born of a family in which gout has been long hereditary, father, grandfather, and maternal uncles having been great sufferers by it, was in excellent health until October, 1878. He is temperate in his habits, fond of all outdoor exercises, an active walker and rider. In the autumn of that year, feeling the effects of the exhausting heat, he drank for a time Burgundy, but abandoned it when he began to perceive that it did not suit his digestion, and occasioned some aching in the joints. While regaining his usual condition, he was exposed to the vapours of turpentine in a newly painted house; an attack of vertigo resulted. From this time on for three months his life was a very miserable one. Four or five attacks of vertigo were often of daily occurrence, and he woke up with them at night, the floor and the bed seeming to dance around vigorously; he himself, however, never appeared to move, in other words, the vertigo was always objective. An attack lasted, it was thought, about two to three minutes; it was often followed by clammy sweat and by dull headache. The worst ones only were attended with sick stomach, or with the subsequent vomiting of a glairy and intensely acid mucus. A symptom as annoying as the vertigo was the staggering gait frequently produced; while walking, he would sway so as to have to cling to a lamp-post, and he, one of the most temperate of men, had several times to undergo the mortification of being taken for an inebriate.

He had no persistent headache, was greatly troubled with impaired eyesight; was obliged almost to desist from reading and from his ordinary pursuits; but bore his trials with unflinching courage. The heart acted normally, with an occasional intermission; he had at times shooting pains in his legs, and aches in the knuckles; the bowels were regular; the urine was habitually scanty, of specific gravity 1024, filled with urates, and occasionally with little cayenne pepper grains of uric acid. The gastric symptoms were in the first month or two very pronounced; they were of the form of a gastric catarrh with much acid dyspepsia. The impaired eyesight has been alluded to. An expert who examined the eyes carefully, pronounced them astigmatic, but stated that in addition there was decided enlargement of the retinal veins, a sort of varicose condition, and a spot of intense congestion in the right eye explaining the absolute blindness to objects in the lower right-hand quarter of the field of vision. In the left eye there was some varicosity of the veins, but no marked congestion; in neither eye-ground was choking of the disks found.

Another most distressing symptom was numbness of the left side, chiefly of the leg, sometimes of the arm and the side of the face. It bore no relation to the vertigo, was apt to occur in paroxysms of from three to five minutes' duration, during which the sensibility of the skin was somewhat impaired, at other times the æsthesiometer detected no abnormal condition.

Some improvement took place under treatment, especially under the strict diet, the use of small doses of Hunyadi water in the morning, and of corrosive sublimate between meals. The gastric symptoms were certainly much benefited, the vertigo happened less frequently, yet scarcely a day passed without some attack, even if slight. A sea-trip was then decided on; and he sailed for Europe in January, 1879. The effect was admirable and immediate, at least, on the vertigo. He had but one seizure, which occurred while passing through Paris, at the end of January. But his other symptoms did not at once subside. On the contrary, headache, which had been a very inconstant, almost absent symptom, while

here, became a prominent one; and more or less dull pain in the head with not infrequent attacks like those of nervous sick headache were common; the swaying, too, by no means ceased, and was, like the headache, for a time aggravated by visiting the picture galleries of Northern Italy.

Pains in the limbs, cramps and aches, even slight swelling in the knuckles, with uric acid deposits in the urine, also happened from time to time. Sugar in any abundance, malt extract, and all wines, except the light red wine of the Riviera, made these symptoms worse, or at once developed them, if they had been absent. Eschewing all wines and great care in diet, especially with reference to saccharine substances, much exercise in the open air in some of the health resorts of the south of France, produced amelioration so decided that he returned home in the autumn well to all appearances, although still a little troubled with the headache and the swaying in walking. Since January, 1880, these have passed off entirely, and while careful about taking enough exercise and about his diet, he is as well as ever he has been. His eyes, too, have greatly improved; when under active exercise and free from care, he can read without glasses, and has had at times glimmering of vision in the spot in the right eye which seems deprived of it.

Reviewing the features which these cases have in common, and taking into account many other instances which I have seen, what I shall call *lithæmic vertigo*, may be, I think, thus described. It is a giddiness frequently repeated; often there are several attacks daily for a few days, and then there is a much longer interval; it may occur at night. It happens irrespective of exertion, although long continued fatigue, especially in reading and writing, excites it; so does mental worry. But anything that aggravates or induces the lithæmic state develops it most promptly. Special articles of food do so; and I have had patients in whom a few glasses of hock, or a single glass of Burgundy or champagne, are sure to cause it the next day. The vertigo is objective, not subjective,—objects seem to whirl around the sufferer, not he himself to move. The giddiness is not associated with loss of consciousness, or this is so temporary that the patient is able to retain his position or speedily to regain it. Still he has to hold on for support to surrounding objects, and I have known him brought down on his knee before it is over. From the alarm and distress which attend it, it is very difficult to form an idea as to its duration. Notwithstanding the exaggerated statements made by the sufferer, to whom the seizure seems terribly long, it is safe to say that it rarely lasts more than a minute or two, and frequently less than a minute. It may come on without warning, or be preceded by a sense of emptiness of the head, by specks floating before the eyes, by dimness of sight. When it has set in, sudden change of position is apt for the next few days to develop it at once, although, perhaps, this is not more marked than in any form of vertigo. It may or may not be followed by headache; generally it is only followed by a sense of discomfort in the head, or by a dull ache of short duration, and, as in Case III., it may be noticed that when the headache in lithæmia becomes a marked symptom, the vertigo is infrequent.

When often repeated, it produces effects on the special senses. Sight is less acute, the field of vision is limited in size; letters look blurred, and there may be inability to see more than two or three letters in a word, or double vision may occur. One eye, or part of one eye, may be temporarily blind; and the ophthalmoscope detects marked congestion, especially fullness of the veins. When no attack has happened for some time, the eye-ground, as in Case II., is found to be normal. Long continued and frequently repeated attacks may give rise to some persistent changes, though never to choking of the disk. It would be unfair to leave the impression that these changes are all the result of the vertiginous seizures. In part, at least, they belong to the lithæmic state itself, and may be caused by it. But the whole matter is new and not worked out; and I invite the attention of ophthalmologists to this promising subject.

The sense of hearing is sometimes impaired for a day or two, and buzzing in the ears is complained of. These phenomena, too, may follow attacks of vertigo, or occur when the patient is only markedly lithæmic, and has not been dizzy.

I have in the cases described alluded to the momentary suspensions of consciousness, the sensations of lightness in the head, with a dark shade passing over the eyes, which are, in my experience, very common, and are dreaded by physicians especially, when afflicted with the disorder, as the precursors of epilepsy. The sense of terror and of fear occasioned is quite inconceivable to one who has not heard these attacks spoken of by a victim. They happen in those who at other times have had distinct vertigo; they are not at the time combined with giddiness, but produce a staggering or swaying, from which recovery is so quick that the disturbance mostly passes unperceived. Again, uncertainty of gait may take place for a long period without any of these signs of brain disturbance. In Case III. it lasted for a year after the vertigo had ceased.

As regards the cause of the vertigo, it is likely that the disorder is produced by the impure lithæmic blood. Whether this acts on the vaso-motor nerves and through them on the cerebral circulation, or primarily on some nerve-centre, must remain for the present a matter of pure speculation. It would not be difficult, following the ingenious reasoning of Woakes, concerning stomach vertigo, to connect the disturbance through the pneumogastric nerve and the lower cervical ganglion with the vertebral artery supplying the labyrinth and adjacent structures. But we must then assume as certain that a disturbance of this is always the cause of giddiness, and that the lithæmic process is invariably connected with a fault in the liver.

Gastric vertigo has just been mentioned, and doubtless it will be thought that the symptoms described are those of gastric vertigo. So they are in many respects; except that, for the most part, there are no gastric symptoms, or but passing gastric symptoms in lithæmic vertigo, while the

evidences of the lithæmic state are the marked features, or soon become so. Indeed, the error has been the other way; lithæmic vertigo has been confusedly included with gastric vertigo, from which we must learn to separate it. This is best done, as just indicated, by dwelling on the comparative absence of the stomach symptoms, and on the evidence presented of lithæmia. But there are unquestionably mixed cases, which it is not easy to analyze.

Headache is not, on the whole, a prominent symptom of lithæmia; that is, persistent headache is not. A dull feeling in the head, especially frontal, much more rarely occipital, happens at times for a day or two, if the digestion be specially disordered; or occurs as a morning headache, or, as already mentioned, for a few hours after an attack of giddiness. But severe acute periodical headaches of neuralgic type are common. They are very much like migraine, except that the bilious vomiting and signs of gastric disorder are far less prominent. They are localized, are increased by noises and by motion, and are frequently accompanied or followed by a heavy deposit of red sand in the urine. This is the way the attack relieves itself, and it suggests a strong analogy with what has often been noticed, that gout in the joints and migraine are prone to happen in the same person, the violent headache ending when the gouty swelling begins.

Neuralgia is a very common complaint in lithæmic subjects, and there is no nerve in the body that can ache which is exempt. Brachial neuralgias with pain shooting down the forearm to the tips of the fingers, intercostal neuralgias, sciatic neuralgias, are very common; neuralgia of the tongue happens; and in women neuralgia of the breast is not rare. The only neuralgia which I have found infrequent, is the one which might be supposed to be the most frequent, that of the fifth nerve; still it, too, may be encountered. Women are, I think, more subject to lithæmic neuralgia than men; we do not absolutely meet with more cases than in men, but this is because lithæmia affects so many more men than it does women.

The sciatic neuralgia may seize upon one or both nerves. There are often paroxysms of pain of three or four days' duration, and lulls of at least as long. This may go on for several months unless checked by treatment for the constitutional state. Sometimes the attack relieves itself by gravel in large quantities being passed. When the disorder is protracted, it may well be, in these lithæmic neuralgias, that the uric acid, irritating and perhaps being deposited in the nerve sheaths, leads to a secondary neuritis. The comparative infrequency of trifacial neuralgia has been alluded to. What is generally called facial neuralgia are cases like this, which at the same time illustrates the form of neuralgic headache above mentioned.

CASE IV.—A professional man, 48 years of age, portly in appearance, consulted me with reference to violent attacks of neuralgia and vertigo. The attacks of neuralgia frequently happened every day for some time. They are not, however, in the course of the fifth nerve, and it is more correct to

describe them as severe lancinating, paroxysmal headache, the pain felt on both sides of the head, especially of the forehead, followed by a little general soreness of these parts, but without localized tenderness in the trifacial. At times there are violent attacks of gastralgia, as violent as the head pains, and apt to take their place. He often has sleepless nights, gets up frequently to pass water, and his restlessness makes him an early riser. He is not a dyspeptic, except that he is at times annoyed with acid eructations; the tongue is clean. The urine is voided in full, rather large, quantities. It has an acid reaction, a specific gravity of 1014, no albumen or sugar. Examined under the microscope, there are urates, and also a large amount of free uric acid, with some epithelium. The pulse is compressible, about 75, easily influenced by emotion and fatigue; the first sound of the heart is short; the second very distinct. The vertigo and the headache are the only cerebral symptoms; the latter is not constant, but disappears for weeks and then returns in those violent outbreaks like neuralgia. These are sometimes terrible, and last, with their fierce exacerbations of several hours' duration and their remissions, for one to two weeks at a time. A half pint of hock will at once provoke the frightful headache, and frequently at the same time pain in the big toe. Aconite and morphia, salicylic acid, but particularly iodide of potassium and colchicum, have relieved the head pains. There are depression and irritability of temper, and want of energy, but these are far from constant, and occur irrespectively of the pains. In bracing mountain air, and taking exercise, he is always well. The attacks of vertigo have been very severe, although they are not frequent; they are chiefly morning attacks, most apt to occur on first rising. A striking feature of the case is the inability to keep warm, and the coldness of the extremities; but this is largely subjective. Yet, the state of the skin is not quite normal; the sensibility is not acute. The two points of an æsthesiometer on the finger tips are not sharply felt, nor correctly appreciated when at all close together. There is the clearest history of hereditary gout. Father, grandfather, great-grandfather, and the mother's father, all had been gouty. He himself has never had an attack.

Under systematic skin friction, moderately active exercise, occasional saline purgatives, restricted diet, mild alkaline diuretic waters, this gentleman improved greatly, and headache and vertigo were strikingly influenced. Oxide of zinc, two grains three times daily, was also taken for a time, and it was thought with decided benefit.

The next case illustrates a most violent form of intercostal neuralgia, finally cured by remedying the lithæmic state.

CASE V.—A physician, 33 years of age, of good constitution and general health, except repeated attacks of left-sided, trifacial neuralgia, occurring every week or ten days since childhood, and expending their force on the supra-orbital branch. Never had malaria, syphilis, acute rheumatism, or gout. Is a moderate eater, and temperate in his habits, using occasionally a little whiskey after dinner and supper, at no time exceeding three ounces in all. There is no hereditary disease, his father is living affected with shaking palsy. Practising in a mining district, there was much hard work and exposure, but his health was fairly good until his return to the city after a three years' absence. Soon, he began to be attacked with what was at first looked upon as pleurodynia on the left side; it was finally relieved by blistering and by a course of iodide of potassium.

and cod-liver oil. For a year or two headaches happened, also generally relieved by the iodides.

In the spring of 1878 he first felt a burning aching pain between the shoulders, extending to the occiput. The pain increased gradually, involved a considerable portion of the left side of the chest, which became sore, and very tender spots could be distinctly made out in the course of the intercostal nerves. There was loss of appetite, and of flesh, constipation, and profound melancholy.

The salicylates, quinia, colchicum, the iodides were taken without relief; nothing did good but a trip to Florida of three months, and exercise in the open air; the pain and all the other symptoms disappeared. But on returning home they soon came back, the melancholy was intense, the chest pains were most violent. These were relieved by the thermocautery applied along the spine over the site of exit of the aching nerves. Yet the relief did not last, and when I saw the patient about two months afterwards, he had severe pains and aches in the dorsal and pelvic girdles. The pains were acute and in paroxysms, there were distinct tender spots to be made out in the course of the nerves; the intercostal trunks previously affected were only slightly disturbed; the pain at times shot along the sciatic nerves of one or both legs, and was combined with very considerable diffused muscular soreness. Not the least evidence of stiffness, swelling, or redness of the joints existed, and no fever. The body pains, which were aggravated in paroxysms, were worse in the evening and early morning and in damp weather. They often ceased when attacks of trifacial neuralgia happened. There was very slight dyspepsia, a clear tongue, some constipation, only trifling loss of flesh, but foreboding of evil, with refined self-torture, and a melancholy as great as I have ever met with. The mental faculties remained good, except some impairment of memory; reasoning was keen on the false facts which the gloomy self-inspection furnished. The heart was slightly accelerated, at times irregular, the first sound short, lacking weight, the second sharp. He passed but little over one pint of urine in twenty-four hours, of specific gravity 1023, free from albumen and sugar; acid, containing a great excess of urates. The urinary examination repeated several times gave much the same results, specific gravity ranging from 1023 to 1028, abundant urates, uric acid forming readily and in abundance, but only after urine acidulated with nitric acid was allowed to stand, dumb-bell and octahedral oxalates in moderate amounts.

I placed this patient on a diet of vegetables, fish, stale bread, and white meats, even these only in moderation; I forbade all stimulants; I insisted upon a certain amount of daily exercise and skin friction, and directed him to drink Poland water freely, to keep the bowels soluble, and to take oxide of zinc, two grains three times daily. After about a month of this treatment he reported himself very much better. In place of passing only a pint of urine daily, he passed three pints, of specific gravity 1017; he had hardly any dyspepsia, his tongue was clean. There had been some attacks of neuralgia, and a little pain in the great toe joint, worse before a rain storm, but they had not been very severe. For one attack of sharper and more protracted character, he took large doses of quinia with the same negative results as on former trials. Colchicum did much more good. He remained comparatively well, his spirits rallying with his improving health, until early in April, when he had a terrible seizure of left-sided intercostal neuralgia. Opium inter-

nally, hypodermics of morphia, and of morphia and atropia, cannabis, and chloral gave but very temporary relief; the attack had been going on for nearly two weeks under this treatment, when I directed him to take $\frac{1}{100}$ th of a grain of aconitia. He took three doses in twenty-four hours, it produced its physiological effects. The pulse sank to 52, was slightly intermittent, a feeling of numbness spread all over the body, and the neuralgia vanished. For a month afterwards he was entirely free from pain, pursuing his treatment with zinc, subsequently with small doses of arsenic, but always drinking freely of diuretic alkaline waters, using natural purgative waters from time to time, and keeping up the strict diet. The arsenic was not long continued, as it did not seem to suit his digestion. He has had but one bad attack of intercostal and dorso-abdominal neuralgia since. Aconitia influenced it, but not as decidedly as in the first trial; hypodermics of morphia and atropia relieved the pain, and the attack, much shorter than usual, lasting only three or four days, was broken up by free purgation with gamboge. At its height and at its decline, the urine, as usual in these seizures, was filled with heavy sandy deposits. The patient is now well, he has been to the seashore; he has gained flesh. He is careful in his diet, takes no medicine, and is cheerful and happy.

One of the most common forms of lithæmic neuralgia is *gastralgia*. It does not differ in its manifestation from ordinary gastralgia, except that it is associated with evidences of lithæmia, and that it is very apt to alternate with other neuralgias. It goes on unrelieved, until its source is detected and removed, and then yields entirely, to return perhaps only at long intervals, if at all, unless depressing care, work, or indiscretions in diet actively re-develop the constitutional fault which underlies it. It leads to emaciation, and is the source of much anxiety; and many is the case I have seen of supposed ulcer or cancer of the stomach which was lithæmic and recovered.

Here is a typical instance, selected from many.

CASE VI.—A gentleman, 40 years of age, had been for two years a great sufferer with violent and oft repeated attacks of cramps in the stomach. While for six months in southern Europe, the disorder almost ceased. The pain now is very severe, lasting, with slight remissions, for about an hour; it is sometimes started by eating, but it is neither necessarily caused nor made worse by taking food. The tongue is clean; the digestion, except for the pain, good. During, and more particularly after, an attack of pain, soreness at the epigastrium is noticed; no tumour can be felt; the abdominal aorta throbs a great deal; there are no murmurs. The patient has been thought to be labouring under gastric ulcer, while abdominal aneurism has also been diagnosticated. There is an old, but not marked history of malaria, none of syphilis. Considerable loss of flesh has happened. At times aching pains in the fingers are complained of. The urine is very acid, high coloured, free from albumen, but full of lithates, and frequently deposits heavy red sand, and shows in abundance crystals of uric acid. I made the patient watch these deposits, and found that their occurrence almost invariably coincided with, or followed the attacks of gastric pain, and when these were frequently repeated and decided, the appearance of the urine could be correctly predicated. A care-

ful diet, with a good deal of milk food, rest from laborious pursuits, saline aperient waters, and the steady use for about one month of the citrate of lithium, broke up the painful disorder. A course of arsenic afterwards completed the cure.

Cramps in the legs and muscular twitchings are often met with in those suffering from lithæmia. The former are apt to come on at night, and are very annoying and painful. They particularly affect the gastrocnemii muscles, and occur much more often in winter than in summer. In one of my patients cramp under the inner surface of the instep is as frequent as in the calf muscles; in another, muscular twitchings of the face are also produced when the lithæmic state is marked. Irregular choreic movements I have also seen in children, and they would be very much more common were the disease more common in childhood. Yet if we look for it we may find it oftener than we suspect. I have now under observation a bright young fellow of eleven, inheriting gout through several generations, with most marked lithic acid diathesis and nervous symptoms; the tendency to irregular muscular movements is only kept in check by rigid attention to diet. *Pains and perverted sensations* are also among the symptoms of lithæmia. Pain in the fingers, in the feet, without being necessarily associated with aching joints, pain in the tendo-Achillis, in the breasts, near the shoulder blades, and in women, at the coccyx, pains in the legs, thought to be rheumatic, and attended with some muscular soreness and stiffness of gait, are often encountered; so are burning sensations of the tongue, and burning of the palms and of the soles. These localized flushings in hands and feet are attended with a very slight elevation of temperature. The general temperature is but little influenced by lithæmia; I think never raised more than a degree to a degree and a half, even during the general hot spells, of which there may be complaint. One of the most singular abnormal sensations is that of great fulness and rather pleasant warmth in an entire leg from the knee down, not accompanied by any sense of burning of the skin. All these perverted sensations are not persistent, but they recur often.

Anæsthesia is also a symptom of lithæmia, though not a common one. I have never found it very extended, but generally localized to an arm or leg, or part of the thigh, or, what is not unusual, on corresponding parts of both arms and legs. It may affect the face and the lips, and those in whom it happens who have headache as a more than ordinarily prominent symptom, have told me that the disordered sensation was on the side opposite to the headache. The sense of numbness is greater than the actual loss of sensibility is found to be. Still, there is some loss of sensibility, less keenness of appreciation of sharp points, inability to distinguish the two points of the æsthesiometer with readiness. One of my patients tells me, that when suffering from the numbness in the lips he can bite the lips without feeling it. The numbness may be associated with formi-

cation or a sense of pricking. It is a persistent symptom in so far that while the lithæmic state lasts, it remains where it has been noticed, but it dwindles down at times to very little, and increases markedly at others. Free purgation always benefits it greatly; faradization with an electric brush improves it, and it will gradually disappear under strict diet, exercise, and remedying the lithæmic state; but recurrences are not uncommon.

In this case it was very marked:—

CASE VII.—Miss S., age 38, inclined to corpulency, has been under my observation for eight years, originally for blood-spitting following an attack of acute bronchial catarrh and pulmonary congestion. She has suffered a great deal from torpor of the liver, at times from acid indigestion, and frequently passes urine loaded with lithates. Aching in the joints and shooting pains in the limbs are also common, and nervousness and sleepless nights. But the most singular feature of her case is a perverted sensibility of the skin, a sense of pricking associated with great numbness. This is limited to the hands and forearm, it may be on one side, it may be on both. There are times when it is absent for months; it is apt to come on in spells lasting in a very decided manner from four to six weeks, and during its continuance, the symptoms of acid indigestion, of sluggish action of the liver, of uric acid deposits in the scanty urine, of aching hands, are apt to be at their height; or it supersedes, as it often long outlasts, these. A blue pill, followed by salines, always strikingly moderates it. It is not a purely subjective sensation; for when very marked an æsthesiometer shows defective tactile sense; when light, it is difficult to say that there is any lost cutaneous sensibility. There is no disorder of the heart or uterine functions; the urine, except the lithates or crystals of uric acid, presents nothing abnormal. Care in diet has had a decided influence on the troublesome symptom, the greatest relief has followed the use of laxatives, and the administration of citrate of lithium, which has increased the flow of urine and altered its acid character.

Other nervous symptoms are sleeplessness, sensitiveness to sounds, great susceptibility to odours. The *sleeplessness* is a very distressing symptom. Bromides and chloral have a good temporary influence on it, but it is best removed by purgatives and diet. Wine generally aggravates it; and so do such articles of food as readily induce the lithæmic state. The *sensitiveness to sounds* is especially annoying in those who have headaches, and loud sounds add not only to these, but provoke or increase the irritability of temper. Undue *susceptibility* to odours shows itself on many occasions. The odour of the magnolia causes headache; that of turpentine is mostly very unpleasant, and I have known it to excite headache and vertigo. A certain *nervousness* which may pass into hysteria is also among the symptoms of lithæmia. I have twice seen in man hysteria from lithæmia; and I am very certain that the hysterical symptoms of women no longer in their youth, and which are attributed to nervous break downs, to menstrual disorders, to approaching change of life and the like, are often really of lithæmic origin, and curable by the treatment which removes the constitutional cause. There are also among the rarer mani-

festations of lithæmia *reflex pains and aches*, for which there is nothing to account, or which are only partially explained by the direct action of the acid urine. To the former belong the pains and sensitiveness in the region of the heart, while this organ shows nothing abnormal except perhaps an occasional intermittency; a distressing itching of portions of the skin, nothing being visible. The latter is illustrated by this case:—

CASE VIII.—G., age 35, a man of extremely nervous temperament, son of a father with lithæmic symptoms; has had a great deal of care falling on him early in life. Has suffered much from mental depression and almost hysterical outbreaks of nervousness. Sleeplessness and irritability of the heart were also among the symptoms; all of which were aggravated by worry and relieved by long absence from home, especially in mountainous regions, and by horseback exercise. Vertigo has happened occasionally, early in the case, which has been going on for five or six years; but it has never been a marked feature. Early in the case, too, gastric symptoms, coated tongue, some acid indigestion were observed, and this led to the long trial of an almost exclusive milk diet for several years with the result of influencing the digestive condition favourably, but having little effect on the nervous phenomena. Of late the digestion has been good; attacks of flatulency and of enteralgia happen, however; the tongue is only at times coated, the bowels are regular.

Studying the case I found no organic disease of any organ; but ascertained that he passed habitually three pints of urine, of specific gravity of 1022, very acid, free from albumen and sugar, but loaded with lithates, and also containing at times a great deal of mucus. It often shows a considerable deposit of red sand, and when this happens to a marked degree his nervous symptoms previously very bad are strikingly relieved. So they usually are by repeated doses of calomel, which is apt to be followed for a few days by sand in the urine. When he has these abundant sediments of uric acid or the urates, a scalding in the urethra, a feeling as if water were passing from him, though none is passing, a constriction and burning back of the glans, a stinging at the orifice of the urethra; a feeling of pain above the pubes, are annoying symptoms of reflex character; and the uneasy feelings at the head of the penis are greatly aggravated by any irregularity in the time of his meals or in diet. This patient was placed on a diet of fish, green vegetables, a little oatmeal, milk, the white meats; he was directed to drink Apollinaris water freely, to exercise, and to give himself as much relaxation as was compatible with his pursuits. The bowels were kept soluble by Hunyadi-Janos or Friedrichshall water; a little calomel and sodium bicarbonate were occasionally prescribed, and, while the uric acid deposits were so marked, a course of citrate of lithium. He is very much better; but he is not as yet quite well; fresh anxieties and worries bring about relapses.

In concluding this examination of the nervous symptoms I must say something of the mental state. There are spells of languor and lassitude which befall the man whose blood is charged with lithic acid, in which all exertion is painful, and which strangely contrast with his usual energy. Then there is depression of spirits and gloom that may amount to melancholy. But above all is irritability of temper; odours annoy, sounds infuriate, nothing pleases, and it requires more than ordinary self-control

to prevent explosions of temper. The man is on edge, and the acid blood literally makes an acid temper. Indeed, many a man who has the reputation of being a curmudgeon, is simply a lithæmic who finds it impossible to control his engendered irritability.

Of the mental faculties the memory is the one which alone really suffers. It deteriorates markedly, especially after lithæmic vertigo. But in time as the lithæmia is kept away by a careful mode of life, it regains most of its original strength.

The mental state described may last for several years with only temporary periods of relief; or the horizon may at once be cleared by the discharge of large quantities of lithic acid in the lithæmic, as it is by an explosion of gout in the typically gouty. Macaulay's description of the Earl of Chatham's condition is, from a medical point of view, strictly correct. A cloud settled on him; he, a most affectionate father, could not bear to hear the voices of his own children. He bought up houses contiguous to his own, that he might not have neighbours to disturb him with their noise. His appetite was fanciful and capricious; he was melancholy, irritable. The disputes of his colleagues, the responsibility of state, bewildered this boldest of mén, who behaved at times like an hysterical girl, bursting into a flood of tears. He had passed months without a twinge of the gout to which he had been subject since boyhood. At length the gout returned. His nerves were newly braced, his spirits became buoyant; he was once more the proud, resolute statesman. *Nunquam poetor, nisi podager*, says Ennius of himself. The hard-drinking old Roman, fresh from his cups, sang the deeds of his sturdy forefathers only when an attack of gout had purified his blood and cleared his mental vision.

The symptoms of nervous derangement in lithæmia are interchangeable. Sometimes one or several exist for a time; the lithæmic condition gets better, they disappear; the lithæmic condition returns, but with it comes a fresh set of nervous symptoms; and so, until the state is permanently remedied, they may appear for years. Indeed, recurrence of lithæmia is one of its characteristics, and the nervous symptoms may be so persistent that it is difficult to set aside the thought that they are not due to an organic cause.

These nervous outbreaks frequently happen when the manifestations of hepatic and gastric disorder of lithæmia, except in so far as they are recognizable in the urine, are not very marked; indeed, I believe they are more common in this class of cases. Still we find more or less of these phenomena at times present: such as flatulent distension of the stomach and bowels, acid eructations, fulness at the epigastrium, and drowsiness after meals; a bitter taste in the mouth; flabby tongue coated at the back; capricious appetite; constipation, or, what is more significant, stools, from altered biliary secretions, either very dark or very light; short attacks of diarrhœa; passing slight jaundice; small ulcers in the roof of the mouth; hemorrhoids; palpitation of the heart with intermissions in its beat; throb-

bing of the great vessels; lumbago; itching erythematous or slightly scaly eruptions, like pityriasis, on the chest and between the shoulder-blades. Again, we may observe that the patient has great liability, as Murchison so well points out, to ordinary febrile colds, and to more severe local inflammations. Perhaps he has passed gall-stones or urinary calculi; or shows that tendency to degeneration of the tissues, especially of the vessels, which is one of the worst results of the lithæmic dyscrasia. Or his kidneys and his heart may become structurally involved; the heart making its affection manifest by association with the signs of high blood pressure in the arteries, its perverted rhythm, the accentuated second aortic sound, the growing evidence of hypertrophy and mural degeneration, in a manner so brilliantly described by Fothergill. But I repeat, these phenomena have no necessary connection with the nervous manifestations; nay, I think the latter are far more apt to exist when these organic conditions are not developed.

As so much in the recognition of lithæmia depends on the urine, I must say a few words about it. It may be, but it rarely is, copious. It is very generally scanty, deeply coloured, and of high specific gravity. It is very acid, readily deposits urates, of pink or brick-dust colour, and even crystals of uric acid. This state of urine exists more or less at all times, but a very large excretion of uric acid or its salts is apt to bring relief to the other symptoms. The pigment is increased in the urine; and under the microscope we commonly find the amorphous urates preponderating, more rarely well-formed crystals of uric acid, sometimes also oxalates. The urea is not increased, except in some instances, and in these loss of flesh is generally going on. Thus, in one case of the kind examined, the urine which was decidedly acid, had a specific gravity as high as 1035—in itself in the absence of sugar a suspicious circumstance,—was acid, deposited very abundant urates, amorphous under the microscope, had no free uric acid, but contained in 10 c.c. .4 grammes of urea, about double the ordinary amount.

If the other symptoms of lithæmia exist, we must not, from the absence of characteristic sediment, conclude against the increase of uric acid. This excess may be, it is known, present in clear urine, and only be determinable by chemical analysis. Indeed, in any doubtful instance we should resort to quantitative analysis, repeated on specimens obtained at different times. It would be well to make quantitative examinations in any case. But the processes are tedious and difficult in general practice. Pavy's estimation of uric acid by its reducing action upon the ammoniated cupric test (*Lancet*, April, 1880) promises best. Examinations of the blood, such as Garrod has made in persons with articular gout, have not to my knowledge been instituted in those affected merely with lithæmia. They would check off admirably the observations on the urine.

Lithæmia is much more common in men than in women. Its chief sufferers are men in the prime of life. It comes on in some who live

luxuriously, eat largely, drink freely, take little exercise in the open air, and are indolent in their habits. But it is quite as often, or oftener, seen in the active brain workers of good habits; in the marked men in the community in which they live; and it is in them too, that the nervous symptoms of lithæmia are most obvious. My list of lithæmic patients embraces many a name distinguished at the bar, in medicine, in the pulpit, in literature, and in the world of finance. And it is not only brain-work, and all the habits this implies, but strain and worry, which induce it. Our present civilization is very rife with its causes. It is a growing disease in this country, especially in our cities. Malaria also excites it, or at least aggravates it; so do sexual excesses. It happens most often, certainly its nervous manifestations do, in persons of nervous temperament, and it is a diathesis which is readily transmitted. Disordered liver action with imperfect oxygenation of nitrogenous matter is supposed to be its cause, and to lead to the accumulation of uric acid and the urates in the blood. I am far from thinking that this theory covers the whole ground. The symptoms of nervous affection are, I firmly believe, the result of the waste-laden blood; but whether the lithic acid, or the compounds generating it, get into the blood in consequence only of deficient glandular action, as of the liver, is not so clear. Again, the disorder may be first excited by some disturbance of a nerve centre? We now hold as an established fact of science that puncture of the floor of the fourth ventricle causes diabetes. The ingenious reasonings of Dyce Duckworth are paving the way for the belief that in the medulla is a trophic centre for the joints, thus explaining the phenomena of articular gout. Is there also such a centre for causing lithic acid formation and lithæmia? But these are speculations not further here to be indulged in.

I must say one word as to the relations to gout. Gout itself is merely one of the results of lithæmia, and the consequences of a functional derangement of the liver, teaches Murchison; lithæmia is simply undeveloped gout, say others. I believe neither view is strictly correct. There is close relationship, and one predisposes, perhaps readily passes into the other. But we have lithæmia where not a typical symptom of unequivocal gout is to be found, not happening even during the lapse of years, and where there is no inherited gouty diathesis. If we take the characteristic features of gout to be the peculiar periodic recurrence of the joint-affection, we see at once the difference. A little aching in the knuckles or toes at times, in very few enlargement of a finger joint, are the only kindred features of lithæmia; and the diminution of uric acid in the urine for several days before the gouty paroxysm, the scanty excretion during it, the mere traces which, as Senator tells us, are found in chronic cases even between the paroxysms, are not analogous to the abundance of lithic acid or the lithates to be observed in lithæmia. There is a belief that gout is rare in this country; and typical gout certainly is comparatively rare. But lithæmia

is most common, and if it be true gout it is pre-eminently the American gout. As seen with us, it is an affection more often acquired than inherited.

The constitutional state, once established, lasts long, and is difficult to eradicate, although it is capable of being eradicated, or so nearly so, that it ceases to be troublesome. Still, under error in diet or fresh worries, relapse happens, and with it may return the nervous symptoms that are the subject of this paper. As to their treatment, the cases here reported have, I trust, made it apparent. But I may, in conclusion, summarize it: The main principle is, to treat the state, not the nervous symptoms themselves. The indiscriminate use of tonics and nervines which most of these patients are subjected to, is absolutely of harm. Nothing is accomplished until the lithæmia is struck at. In doing this, our most potent means is diet; without attention to it, other remedies are nearly valueless. The diet must be a sparing one, and I think that with those of enfeebled digestion the American plan of a substantial breakfast is best, for in the morning the digestive powers are usually strongest; the other meals must be very light. We diminish the work of the liver and kidneys by lessening the amount of highly nitrogenized food and of the hydrocarbons; hence beef and mutton, butter, cream, fat of meat, sugar in all forms are forbidden, and the less the patient takes of alcohol in any shape the better for him. Champagne is poison to most, a light claret is least objectionable, but water is the best drink for the lithæmic. Fish, oysters, fruits that do not contain much sugar, the green vegetables, except asparagus, are permissible; so are bread, wheaten meal, and oatmeal. Potatoes should be used in moderation, as they are mostly not well digested; eggs should be eaten sparingly. Poultry and the white meats are allowable; and with reference to other meats, although they are, strictly speaking, contraindicated, I find that, plainly cooked, they are well borne; the brain-worker especially requires them, and does better taking them than remaining on an unvarying diet without them. Fats and sugars are certainly far worse, and I have met with more than one case aggravated by taking the sweetish extracts of malt to strengthen the nervous system and the digestion.

Exercise is of importance next to diet, as active as possible without fatigue. Horseback exercise is admirable for persons who will take the time; and I have known the greatest advantage derived from the Swedish movements, especially from those that exercise the muscles of the trunk. Of course, full action of the skin is to be stimulated, and I generally make daily systematic skin friction, either after a shower bath or without it, part of my directions, and when it suits, also order an occasional Turkish bath. To live very constantly in the open air; to take a long mountain tramp or an ocean journey, are most useful prescriptions to persons who can comply with them.

Of medicines, those that stimulate excretory action by the bowels are the most advantageous; mercurials, and the saline purgatives do well for

the purpose in view, but the former at least are too wasteful of strength for frequent use; the nervous tone has to be kept up, not depressed. On the whole, the natural saline mineral waters answer best; and the Hunyadi-Janos, the Friedrichshall water, the Saratoga Congress water are most to be depended on. Nor is it only the purgative waters which are so useful; the drinking of those that tend to neutralize the uric acid by their alkalinity, and to act freely as diuretics, such as Carlsbad, Contrexeville, and Vichy water, or, in this country, the Capon spring water, the Saratoga Vichy, and the Poland water, are excellent; and the free drinking of a table water now much employed, the Apollonaris water, has been, I know, of marked use to many lithæmics. Citrate of lithium often does good, iodide of potassium and colchicum less often. Medicines of direct action on the nervous system I rarely prescribe, until at least the lithæmia is being broken up, or as a very subordinate part of the treatment; among these zinc and arsenic have seemed to me the most serviceable. Bromides may be employed for the nervousness and the sleeplessness, or to influence the headache after the vertiginous seizures. But the less often they, or chloral, are used the better. Remedies of the kind should be reserved for very special occasions. The way to relieve the nervous symptoms of lithæmia, I repeat, is to remove the lithæmia.

ARTICLE II.

ILLUSTRATIONS OF HYPÆSTHESIA (ANÆSTHESIA) OF THE THROAT. By LOUIS ELSBERG, M.D., Professor of Laryngology and Diseases of the Throat in the University of New York, Lecturer in Dartmouth Medical College, Attending Physician to Charity Hospital, etc.

ONE of the least known subjects in the domain of laryngology is that of neuroses of sensation. With the exception of the references in the systematic treatises of Cohen, Mackenzie, etc., not a single case of hypæsthesia of the throat has hitherto been reported or discussed in this country. I define hypæsthesia as diminished sensibility, which is functional and not merely subordinately symptomatic. This definition excludes, on the one hand, ascertained structural throat lesions, which diminish the sensibility by involving directly the peripheral nerves, and, on the other, the conditions in which the particular diminution of sensibility of the throat has none other than a mere symptomatic significance. Instead of "hypæsthesia," the term "anæsthesia" is more generally used; but this should properly be confined to the entire absence or loss of all sensibility, though of course it may be coupled with the adjectives partial or incomplete. The term "analgesia" (with its synonyms analgia and anodynia) is used to denote a loss of the sense of pain, not necessarily accompanied,

with a loss of all other sensation ; when the sensation of pain is diminished, not completely lost, I prefer the term "hypalgia."

It is well known that the normal sensibility of the skin varies greatly in different portions of the body surface, and in different persons ; this is true to a still greater degree of the throat ; moreover, its sensitiveness is very different at different times in the same person ; nevertheless, there is some agreement within recognizable limits, and excessive variations must be regarded as abnormal. Nearly half a century ago E. H. Weber¹ experimented on acuteness of sensibility of different portions of the body, and the various æsthesiometers now used are based on his observations. He measured the degree of sensibility by the distance between two legs of a pair of compasses which is required in order that the two points make distinct impressions. In addition to the skin, he examined the mouth, and found that at the tip of the tongue the two points were separately felt when only half a line apart, while on the dorsum and on the edge of the tongue (one inch from the tip) they had to be four lines apart, on the mucous membrane of the hard palate six lines, and over the gums nine lines. On account of the irritation, which touching the throat with any instrument usually produces, it is very difficult to arrive here at any accurate æsthesiometrical results. I have devised a throat æsthesiometer, an account of which will be published in a paper I prepared for the recent International Medical Congress at London.



As shown in the wood-cut, my æsthesiometer essentially consists of two rods, so connected together that their points can be easily approximated and separated, the distance being indicated on a scale near the handle. It is provided with metallic tips *A* in the figure, and soft rubber tips *B*. As the normal distances between the two uncovered points necessary for their distinct appreciation vary from one and a half or two, to three and a half or four centimetres, it is clear that the sensibility of circumscribed spots cannot thus be measured. The examination of sensitiveness to temperature and pressure is more important than merely that of the distance at which the two points are felt separately. The most convenient manner of measuring the differential appreciation of temperature is to give to the two points of

¹ Annotat. Anat. et Physiol., pp. 44–81, quoted by Dr. Johannes Müller, Handbuch der Physiologie des Menschen, Coblenz, 1837, vol. 1. p. 711.

the æsthesiometer, mounted with the metallic tips, different degrees by dipping them into water of different temperatures. For investigating the delicate appreciation of pressure the soft rubber tips are used. Electricity furnishes the best means for measuring the sensitiveness to pain. I discriminate between three different kinds of normal as well as abnormal sensibility of the throat, viz., 1, tactile, by which contact, temperature, and pressure are appreciated; 2, dolorous, by which pain is appreciated; and 3, reflex, from which result muscular contractions, such as cough, spasm, gagging, choking, etc., as well as intra-vascular and secretory phenomena; and each of these kinds of sensibility must be examined æsthesiometrically.

With two or three exceptions, diminution of sensibility of the throat has been observed hitherto in cases only of diphtheria, hysteria, and bulbar paralysis.¹ These exceptions are the case of Ott², that of a servant girl, thirty-eight years old, in whom together with cadaveric position of the right vocal band there was anæsthesia of the right half of the larynx, and apparently, some hypæsthesia of the other side. The nasal septum and soft palate were absent and the posterior wall of the pharynx was ulcerated and showed radiating cicatrices. These and other characteristic signs led to the diagnosis of degeneration of the pneumogastric nerve at its origin in the brain, in consequence of syphilis. Whether the syphilis was acquired or hereditary could not be positively determined. Three months after admission the patient died; there was a carefully conducted autopsy and microscopical examination of the brain. Dr. Ott does not fail to call attention to the many interesting features of the case, particularly the non-interference with the action of the heart and with respiration, and the fact that with so much destruction in the nose and pharynx there was no structural lesion in the larynx. The second exception referred to is the case of Jurasz³ that of a boy six and a half years old who in the course of a croupous pneumonia became affected with difficulty of deglutition and a nasal voice. Examination showed, without organic change in the throat, a relaxed condition of the velum, and no reflex and no sensation on being touched with a probe. Jurasz⁴ also reports the case of a young English lady, otherwise healthy, with laryngeal papillomata. She had never before been examined laryngoscopically. Jurasz introduced a probe during the first mirror examination and touched different

¹ See Ziemssen, *Handbuch der speciellen Pathologie und Therapie*, Leipzig, 1876, vol. iv. p. 434, or the translation: *Cyclopædia of the Practice of Medicine*, N. Y. ed. vol. vii.; Cohen, *Diseases of the Throat and Air Passages*, New York, 1879, p. 624; Mackenzie, *Diseases of the Throat and Nose*, London, 1880, p. 420, etc.

² Zur Lehre von der Anæsthesie des Larynx. *Prager Medicinische Wochenschrift*, Jan. 26, 1881, p. 35.

³ Ueber die Sensibilitäts-Neurosen des Rachens und des Kehlkopfes. *Volkman's Sammlung Klinischer Vorträge*, No. 195, p. 22.

⁴ *Ibid.* p. 14.

points in both larynx and pharynx without producing either a disagreeable sensation or any reflex. On the next day he performed galvano-cautery and found the patient "strikingly little sensitive." He thinks that such cases which every laryngologist might report should warn us to be careful in interpreting a hypæsthesia as a sensory neurosis. He suggests as a sure criterion that morbid diminution of sensibility is accompanied by a motor neurosis of these organs or some other affection of the nervous system. In this view I cannot coincide. I think every *excessive* variation of ordinary sensibility must be considered abnormal even if we do not yet know its clinical importance. As to what really constitutes an excessive variation must of course be left to the appreciation of the experienced examiner; no one can form a positive judgment on this case of Jurasz from the meagre data given.

To these cases I desire to add the following:—

CASE I. *Tactile and Reflex Hypæsthesia, with Undiminished Sensibility to Pain.*—M. R., at present 44 years old and showing the characteristic evidences of progressive paresis, first came to me November 9, 1878, more than two and a half years ago. From his history I learned that when a boy, he differed from the other children in the family in character as well as in cranial configurations; he was not studious at school, but preferred to roam about in the country and indulge in daring feats of climbing and other athletic sports. He has kept up pedestrianism and other physical exercises, but had masturbated for some little time. Is married and has several children; now seems, however, to be lacking in natural affection for his family, and is especially averse to sexual intercourse. In business, he has been rather successful, being shrewd and cunning; but on several occasions, he was unsteady, made foolish purchases and thoughtless sales. He had received a shock over twenty years ago, by a partner's embezzlement while he was suffering from some fever, perhaps typhus. He became delirious, and while possessed with the idea of pursuing the defaulter, he wandered about the country for four weeks. Since then he has two or three times had fits of despondency lasting as long and longer, consequent on business disagreements. He has had attacks of uncontrollable anger at his brother, wife, etc., on the slightest provocations, and committed such freaks as hiding in the coal hole, disappearing suddenly in the street, staying during the daytime in bed without assigning any cause (he denied that this was to masturbate, although he freely spoke of his doing so often), not eating for several days, etc.

I examined him very closely and observed him from November 9th to 13th. He talked very slowly and uncertainly, his voice was thick, otherwise normal. He complained that his throat felt *unnatural*. No impairment of either motion or sensation in any other part of his body was complained of, or could be detected; and in the larynx and pharynx, muscular action seemed uninterfered with, except that it was sluggish. He swallowed apparently properly, only very deliberately, but said he could not swallow faster, though he tried, and perhaps it required a little more effort than formerly. There was a good deal of saliva and mucus in his mouth and in the valleculæ. On being touched with the finger and various instruments—not piercing the mucous membrane—sensation in both the pharynx and larynx was found to be markedly diminished; what seemed

very curious to me, and was examined on several different occasions, was that pricking with a sharp point, as well as electricity if at all strong, was felt perfectly well. In fact, he was afraid of being hurt and perhaps exaggerated his sensation of pain, though not so much as to be called oversensitive. On the other hand, the finger and the laryngeal probe induced gagging and coughing with much difficulty, and the patient could voluntarily repress these reflex contractions entirely. He was also able at his will to produce these and all phonatory contractions. Muscular reaction to electricity was not diminished. In the course of subsequent examinations, hyperæmia of the vocal bands and to a slighter extent also of the whole pharyngo-laryngeal mucous membrane appeared, and after applying an astringent disappeared, to come again the next day and to go away without any treatment.

I have seen the patient several times during the intervening two years and a half. His disease has steadily advanced. Paresis is now seen in his face, gait, gestures, etc. He is now under the observation of an excellent physician and a specialist for nervous diseases. In this case it may be that an autopsy, which sooner or later may perhaps be had, will throw light upon the locality of a nuclear centre for the sensory innervation of the throat, as certainly for some time his disease seemed to be confined to this domain. From clinical observation I believe such an independent centre to exist, and Dr. Spitzka, of this city, has suggested to me that it is probably formed by the continuation of the gelatinous gray matter of the posterior spinal horn, which is situated upon the mesial side of the ascending trigeminal root, corresponding (in a transverse section of the medulla oblongata)—in the exit level of the pneumogastric nerve—to the line of demarcation between the restiform column and the lateral field of the medulla. The reasons for adopting such an hypothesis I shall discuss on another occasion.

Analgesia.—Of two cases in which sensitiveness to pain was abolished, though some tactile and reflex sensibility remained, one was certainly of diphtheritic origin; in the second, the following case, the existence of diphtheria was doubtful.

CASE II. On September 21, 1875, Mr. J., of Newburgh, N. Y., brought his son Joseph, æt. 8 years, to me on account of difficulty of swallowing, and nasal speech. The boy had always had large tonsils, hard breathing in the night, some thickness in his speech, and frequent attacks of sore throat. He never has had "regular croup," scarlet fever, or measles. A month or five weeks ago he had throat trouble, very much like what he had had several times before. The family physician called it "follicular pharyngitis," and positively denied its being diphtheria. The father is certain that there were no white patches,—only a few raised spots on his throat, a good deal of swelling, running at the nose, and some fever. The boy was three days in bed. About two weeks ago the voice became nasal, and liquids returned sometimes through the nose. The difficulty of swallowing increased, so that now he cannot swallow liquids and solids at all, and semi-solids with great effort and care only, and then not without cough and spasm. The tonsils were found to be hypertrophied and the throat full of phlegm; but no inflammation present. The velum and uvula were relaxed and somewhat inclined to the right side. During attempts at phonation the palate remained immovable. Rhinoscopic and laryngoscopic examinations showed nothing abnormal. The little patient

allowed me to pierce the velum with a sharp-pointed lance, so that it bled, without complaining of pain. No pain was felt on pricking with the same instrument the back of his throat, the epiglottis, the interior of the larynx, or even the inter-arytenoid fold; but the touch of the instrument was felt, and cough and other reflex reactions were induced, though less violently than normal, in the upper parts, while it seemed to me that on touching the lower portion of his throat that was accessible, for instance, the front wall of the œsophagus, or on passing an instrument below the *rima glottidis*, the reaction was more than usually severe. With energetic use of electricity, tonsillotomy and prolonged astringent local treatment, normal swallowing, speech, and sensibility became restored.

CASE III. *Anæsthesia Dolorosa*.—B. G., merchant, aged 37 years, born in Germany, but since childhood residing in this country, principally in the southern States, consulted me September 15, 1875. He was in the southern army during the rebellion and twice wounded, neither time seriously; but has for many years suffered, off and on, with chills and fevers, and taken quantities of quinia. He comes to New York regularly once a year, usually feels better here than in Tennessee; never before suffered as he does now; thinks he took cold while travelling in a sleeping car. For three days he has had a pain in his throat, which for several hours last night was very violent. To locate the pain he covered over the whole of the larynx. Inspection showed nothing abnormal in either larynx or pharynx, but, to my astonishment, instead of hyperæsthesia I found there anæsthesia; in most places, not confined to either side, the sensibility was entirely lost, in the others it was markedly diminished, the loss of sensibility involving even the skin covering the larynx. The spontaneous pain was neither increased nor diminished by the examination. There was no difficulty in speaking and but little, if any, in swallowing, and nothing wrong with the general health. The pain, at the time of examination, was described as being a boring or dull aching, but was said to have been last night acutely lancinating. I applied locally by means of a sponge a saturated solution of iodoform in sulphuric ether.

This was in the forenoon. At 7½ P. M. I was hastily summoned to the hotel where Mr. G. was staying. I found him in bed and in such agony that I had to give him a hypodermic injection of morphia to quiet him at all. The pain had been much less since the treatment in the morning; but about 6 P. M. an exacerbation had occurred ushered in by a distinct chill. About 9 o'clock the pain subsided with a perspiration. The spleen was enlarged and indurated; and agreeing with the patient that his suffering came from his old enemy—malaria—I let him take twenty grains of sulphate of quinia in solution about midnight, ten grains the next morning, and five grains three times daily for a week. During the next day he had some of the steady aching pain, but no evening accession. Gradually the pain discontinued. Two weeks later, there was no pain, but still some diminution of sensibility both internally and externally. When I saw the patient again, a year later, the sensibility was normal.

CASE IV. *Reflex Hypæsthesia with Normal Tactile and Dolorous Sensibility*.—On July 20, 1873, a lady, probably about 30 years old and married, was sent to me by her singing master because she had lost the power of sustaining notes. She had nothing to complain of as to her health except being tired more or less all the time, which, however, she attributed to the hot weather and worriment of mind. So far as I could ascertain at this one interview she seemed sound mentally and physically. Laryn-

goscopic examination showed nothing wrong structurally; there was neither anæmia nor hyperæmia; on trying her voice I saw that the vocal bands seemed to act perfectly on emitting a note, but their tension lessened and the note flattened a moment after. A little later, the mirror not necessarily being moved out of position, a renewed effort brought out the pure good note again, which, however, became flat in spite of her best intention to hold it. There was an accumulation of saliva in the vallecule. The touch of the mirror or of the finger in the throat, and of probes in different parts of the larynx, produced no reflex action except quick movements of adduction and abduction of the vocal bands when they themselves or the part in their immediate neighbourhood were touched, but no cough whatever. Contact was felt even if made ever so gently, and the sensibility to pain was normal.

I could not succeed in ascertaining directly any paresis of the thyro-cricoid muscles. I advised her going to the country (Catskill Mountains), and gave very decided hygienic directions. She did not return to the city. I learned that she never got any better, and probably committed suicide a year or so later.

CASE V. *Hypæsthesia with Localized Hypersensitiveness to Temperature*.—Mrs D. W., 58 years old, a widow for three years, is the mother of five children, the youngest fifteen years old. Her husband had long suffered with pulmonary trouble, and died from consumption. She, herself, while young suffered from all sorts of sickness. She had the various children's diseases, but grew up to be strong and hearty. She had easy confinements, and always enjoyed good health until three years ago while her husband was ill with his last sickness. She first noticed an accumulation of foamy saliva and phlegm in the mouth and throat, especially on lying down. She first noticed it on trying to lie down to rest in the daytime after being tired out with nursing, etc. This became so bad as to almost prevent sleep and rest night and day. Gradually difficulty of swallowing came on. Swallowing now requires a great effort and is almost always accompanied with a very peculiar noise. She, being a German, calls it a "Schnorren" and a friend of hers describes it as an "abrupt purring clatter." I have heard it often, and unless these three words describe it, it is indescribable. There is also frequently eructation of food, both solid and liquid, immediately after swallowing, but nothing comes out through the nose. She says that she has trouble in getting the temperature of her tea just right, and that she has noticed that food which appears to other people of indifferent temperature strikes her as either too hot or too cold. There is constantly present a large amount of saliva and phlegm, probably from hypersecretion, as it seems too much to be merely an accumulation of the ordinary amount. I found the sensibility of the pharynx and larynx to be much diminished every way, except that sometimes the metal tip of the æsthesiometer was felt as being extremely cold. Careful examination showed that the sensibility to temperature is very much exalted at the entrance of the œsophagus and in the upper portion of the larynx posteriorly. This hypersensitiveness is quite localized. The epiglottis is hypæsthetic, nevertheless if there ever was a woman free from what is called "hysteria," it certainly is Mrs. W. In spite of the difficulty of swallowing—and that is the only trouble she knows of—her general health is excellent. I have prescribed nux vomica, applied the ethereal solution of iodoform to the œsophageal and laryngeal portions sensitive to temperature, and used electricity both indirect and direct to other portions of the throat. She is improved, but still under treatment.

ARTICLE III.

THE SYMPTOMATOLOGY OF PRIMARY, IMMEDIATE, OR DIRECT HEMORRHAGE INTO THE VENTRICLES OF THE BRAIN. By EDWARD SANDERS, M.D., late House Physician, Bellevue Hospital, New York; Attending Physician to Mt. Sinai Hospital Dispensary, Department of Internal Diseases.

IN the July number of this Journal for the current year, I studied in detail the varying modifying conditions of a primary irruption of blood into the ventricles of the brain, the article dealing more especially with the etiology, pathology, morbid anatomy, prognosis, and diagnosis of the disease, the main object being to establish the existence of such a morbid condition. Considering that the occurrence of such a form of hemorrhagic effusion into these important cavities has been demonstrated, I now proceed to complete the study of the subject by discussing the symptoms which characterize its clinical manifestations. These naturally divide themselves and are best studied under the two general heads of the premonitory symptoms, and the symptoms of the attack.

Premonitory Symptoms.—We may in the same way speak of the premonitory symptoms of this disease that we do of similar manifestations in ordinary cerebral hemorrhage. Such symptoms are not, however, as Nothnagel points out, truly premonitory of impending hemorrhage in the same sense in which we speak of the prodromal stage of the acute exanthemata, but rather indicate active intracranial disease, especially vascular disturbances, which may or may not be followed by hemorrhage. Bearing in mind this restricted use of the term, primary intra-ventricular effusion of blood may, like extravasation into the brain substance, be said to be preceded by premonitory symptoms. They are in no way characteristic of the disease, in fact they are entirely analogous to those of ordinary cerebral hemorrhage, and cannot be distinguished from them. They may exist for a considerable period preceding the actual attack, or may first appear a few hours only before its onset; they may be so slight as hardly to attract the attention of the patient, or may be so marked and violent as to strike the most careless observer; they may be few or many; but the severity and rapidity of the attack bear no positive relation to the previous existence or non-existence of such premonitory symptoms, nor to the intensity or feebleness of such as may have preceded the seizure.

Of the 94 cases of primary ventricular hemorrhage collected by me, in 32 cases the clinical history was either entirely wanting or so imperfect as to render them entirely useless for the determination of the symptomatology. Of the 62 remaining cases, in 24 premonitory manifestations are noted as being present. Cephalalgia is the most common and constant, and therefore the most important of the premonitory symptoms. Its existence is noted in 15 cases. It may be present for many months or even years,

or may first appear a few hours or perhaps immediately before the onset, it may be continuous or intermittent, it may be slight or aggravated, it may be localized or diffused, it may be dull or shooting in character, its seat may be fixed or varying; in fact its general characters in no two cases can be said to be similar. Thus in one case it is referred to as an obstinate, persistent pain; in another as an acute momentary pain darting through the head a short time before the attack; in still another it existed as a mere sense of fulness in the head for some time previous; in a fourth there were occasional pains and heaviness in the head; of a fifth case it is stated that the patient had complained almost every day for several months of a not very severe headache; another had frequently suffered from a similar condition; and in a seventh, that of leucocythæmia, the patient began to complain of pain in his head about twelve days before the fatal attack. One patient suffered from continual cephalalgia for two years, so the history states; another was subject to headache; another had merely a slight pain on the day of the attack; another, a violent cephalalgia just before the seizure; while in an instance of cerebral aneurism, the patient complained of violent headache; and in another case of the same kind, eight weeks before its rupture the patient suffered from headache especially on rising from the horizontal posture, gradually increasing during the course of a week, the pain being seated in the vertex becoming very severe, but finally disappearing. From the foregoing it may be deduced, that cephalalgia is only important in so far as it points out the possibility of occurrence of some form of cranial disease; but for the differentiation of such disorder it is absolutely useless.

Dizziness or giddiness is mentioned in 8 cases, being about second in frequency to cephalalgia. In several it preceded the attack for some time, in others occurred several days before or immediately before it. In one patient shivering or chilliness is noted, in this case ushering in the seizure only by a few hours. Among the other premonitory symptoms noticed some time before the actual onset, we find drowsiness, heaviness of head, slight deafness, malaise, peculiar indescribable sensations about the head, and sensitiveness of one cheek, each in one case. In two patients sickness of the stomach was present some time before the seizure. In three instances a muscular weakness is reported as having pre-existed, and then only as an occasional or persistent sense of numbness or feebleness in the lower extremities in two, and in the right extremities in the other cases, in one patient preceding the attack only by a few hours. In one case cramps preceded the onset for some time, and in another patient symptoms of passive congestion of the brain are described as being present, this same individual often finding himself unable to remember the word he wished to use; while in two others it is merely noted that premonitory signs had been observed.

These premonitory symptoms may be grouped together or may occur

singly, the rule apparently being, judging by my cases, the latter. From a diagnostic or prognostic point of view they are of but slight practical importance.

Symptoms of the Attack.—Here again I must draw attention to the close resemblance in the mode of onset between ordinary cerebral hemorrhage and the form with which I am dealing. Like it, it varies in the different cases, beginning in one by convulsion, in another by coma, in yet another by paralysis. The different modes of onset may be best classed and discussed under the following heads:—

1. By rapid death; 2. By convulsions; 3. By paralysis without loss of consciousness; 4. By paralysis with partial or complete loss of consciousness; 5. By partial or complete loss of consciousness without paralysis. The mode of onset is more or less distinctly mentioned in 45 cases.

1. *By rapid death.*—This has already been discussed in my previous article when speaking of prognosis (*Amer. Journ. of the Med. Sci.*, July, 1881, p. 127).

2. *By convulsion.*—This was the ushering-in symptom certainly in four cases, and possibly in two others, of which it must be admitted the histories were very imperfect. In the four former death was rapid, in one “almost immediately,” in the second, “three hours after the convulsive seizure,” in another, “seven hours after the invasion of the convulsions,” and in the fourth about twelve hours after the beginning. In the two latter the mode of onset cannot be positively established, but in both convulsion seems to have been the initiatory symptom, and in these cases death followed respectively in twelve hours and one week. In all these cases blood was found in both lateral ventricles, in two being present in all the ventricles, in two in the two lateral and the third, in one of which there was found some spinal meningeal hemorrhage; in one in the two lateral and the fourth, and in one in the two lateral ventricles alone. In all the hemorrhage was abundant.

3. *By paralysis without loss of consciousness.*—This was the opening symptom in 5 cases, in 3 appearing as a left-sided hemiplegia, in 1 as a paralysis of all the extremities, and in one the seat of the paralysis is not stated. In two of the three cases of left hemiplegia there was defect of speech, probably, however, due to the lingual paralysis which coexisted in both patients. In neither did it amount to a true aphasia. Although such an onset can hardly be said to be overwhelming, but must rather be considered comparatively light, still in a prognostic point of view it is of bad import, since death rapidly followed in all the cases, a fatal issue occurring in 2 hours in 2 cases, in 12 and 19 hours in 2 other cases, and only in 1 case was it delayed to the third day. It does not seem to bear any relation to the quantity or seat of the extravasated blood, since in two instances it was found in all the ventricles, in one in the right lateral and

third, in another in the third and fourth, and in still another in the lateral only. However, the lateral ventricles were generally involved.

4. *Paralysis with partial or complete loss of consciousness* seems to have been one of the most frequent modes of onset of primary ventricular hemorrhage, having been observed in no less than 15 cases. In 5 the unconsciousness was complete from the very beginning; in 3 partial, varying from mere stupor to semicoma; and in 7 cases the degree of loss of consciousness could not be ascertained from the history. In 9 cases the paralysis was hemiplegic, five times being left-sided, four times right. The seat of the hemorrhage and the amount of blood poured out seem to bear no positive relation to this mode of onset, although in every case either one or both lateral ventricles were filled with blood, in 5 cases the blood being found in the left lateral ventricle only, in 1 in the right lateral alone, in 3 in both lateral, and 3 in all, in 1 in the lateral and third, in 1 in the left lateral and third, and in another case in the right lateral, third and fourth ventricles. In only 1 case was utter powerlessness or complete paralysis noticed at the onset. The period of time intervening between the onset of the attack and death varied in these cases from less than one hour to eight days, most of the patients dying only after several days had elapsed. This mode of onset may, therefore, be said to be comparatively mild.

5. *By partial or complete loss of consciousness without paralysis.*—This is the most frequent mode of onset met with in primary intraventricular hemorrhage, occurring in 20 of my collected cases. The degree of loss of consciousness varied greatly in the different patients, but in the majority, 14 cases, was complete from the very beginning. In the 6, in which the unconsciousness was partial from the commencement of the attack, in all but 1, one or the other of the lateral ventricles was found distended with blood, and in all but 1 the hemorrhage was moderate in quantity. In the 14 cases, in which the coma was complete from the very beginning, the same relation as regards the seat of the hemorrhage seems to have held good, but in the majority the extravasation was far more abundant. Whether or no the degree of loss of consciousness is related to the suddenness of the effusion I am unable to decide, though the necessary deduction from the cases examined would seem to be in favour of such a supposition. Death is usually delayed in the cases opening with loss of consciousness, several days usually elapsing before the fatal issue occurs; in eight cases two or more days intervening between the onset and death. In two of these cases the onset appears to have been by loss of consciousness conjoined with rigidity of the extremities.

It will be observed that I have been, in great part, unable to determine a definite relationship between the mode of onset and the seat and amount of the effusion, but a more positive connection has been established between the onset and ensuing rapidity of a fatal issue.

Before entering on a detailed description of the symptoms of the disease it is necessary to state that, as in the diagnosis of most other diseases, there is no single symptom which can be considered characteristic of it. As the late Professor Budd was in the habit of saying, speaking of the diagnosis of pregnancy, "it is rather by an accumulation of evidence than by any single symptom that we are able to decide." (*Verbatim Report of Lectures on Obstetrics.*) Hence, although each symptom or set of symptoms is taken up in turn, we must fix our minds upon the fact that, by the peculiar grouping of these symptoms, is the totality of the clinical history of the disease made up.

I. *Deranged Intellection.*—Disturbances of intellection are, in the vast majority of cases, present at some time, varying in degree from a mere confusion of mind or a simple drowsiness, to stupor and coma more or less profound. They may appear at the very onset or may be delayed.

Confusion of mind, as an early symptom, appeared in two cases, in one the patient was found supporting himself by a bed-post, very much confused, but still conscious; in the other his mind is described as for a time seeming very obtuse, though intelligence was apparently unaffected.

Delirium, usually of a quiet, muttering form, sometimes appears in those cases where life is prolonged for several days, in such being probably indicative of cerebral irritation, perhaps inflammation of some part of the brain, due to the presence of a foreign body, the extravasated blood, in fact in two cases secondary inflammation of the ventricular lining membrane actually did occur, as shown by the *post-mortem* appearances. The delirium may appear quite early, but in most cases shows itself only after several days, coincidently with febrile symptoms.

Drowsiness.—Simple drowsiness I presume to be a rare symptom, since I find it recorded as present in two cases only. In one it took the place of light coma, only again to be followed in its turn by complete unconsciousness, while in the other it soon gave place to coma.

Stupor exists more frequently than simple drowsiness, though the same remark holds true of it that does of the latter, it is usually soon followed by coma. However, in several instances, the loss of consciousness seems at no time to have reached a degree which could be considered as a true coma, but rather remained a pure and simple stupor throughout; as in a case by Mayo, and in my own patient.

Collapse.—In several patients collapse occurred at the very beginning of the attack, while in one other case it soon followed the initial symptoms. In none did reaction take place, and in all death rapidly supervened.

Unconsciousness.—"Where hemorrhage takes place into the ventricles of the brain," says Le Gros Clark, "it is usually in sufficient quantity to produce coma, but this is not invariable." This statement, though apparently a mere surmise, as indicated by his after-remarks, is borne out by facts; for in 54 out of 88 cases, in which more or less direct reference is

made to this point, loss of consciousness, either partial or complete, was observed; in some instances being partial at the commencement, and so remaining throughout, or gradually becoming more and more profound until complete abolition of intelligence was reached; in others sudden coma, complete in degree, came on early, continuing so to the end, or, as occurred in quite a number of cases, improvement followed, intelligence being partially or even absolutely restored, and so persisting for a longer or shorter period of time, only to again give place to coma. In no case, as far as I am able to determine, was consciousness retained throughout. Coma, therefore, whether light or profound, is to be considered as a constant symptom of primary intraventricular hemorrhage. On comparing the prevalence of this symptom with the same in the secondary form, we find the following statements by authors. "I said that if it (the blood) burst through into the ventricles, then he would fall into a state of coma." (Wilks, *The Med. Times and Gaz.*, vol. i., 1868, p. 439.) Bastian (*Clin. Lects. on the Common Forms of Paralysis from Brain Disease, The Lancet*, vol. i., 1874, p. 720) says: "More frequently, however, we find this condition of coma produced by an extensive effusion of blood, which breaks its way from the brain-substance into the lateral ventricles, etc." According to Aitken (*Pract. of Med.*, vol. ii., Philad. 1866, p. 260): "Coma is very profoundly marked at the commencement, and remains of equal intensity, or the patient, after partially recovering from a slight seizure, is again suddenly plunged into profound coma, from which there is no recovery. This second attack is presumed to indicate the rupture of the hemorrhage, either into the ventricles or the arachnoid cavity, from its original site of extravasation in the medullary substance of the brain near the ventricles, or near the surface." We thus see the close resemblance, as regards this symptom, existing between the primary and secondary forms of ventricular hemorrhage, and therefore, as a differential sign its mere existence is of but little practical value in differentiating these two conditions. It may vary greatly in degree; in some cases, however, the coma may be so extreme that external irritations, no matter how powerful, may be unnoticed.

Lidell (*Treatise on Apoplexy, Cerebral Hemorrhage, etc. etc.*, N. Y., 1873) seems to think that the amount of blood extravasated determines the degree of unconsciousness. This supposition my cases distinctly disprove; for in many, where the hemorrhage was comparatively slight, as, for instance, only partly filling one lateral ventricle, coma was present to a marked extent. Such were cases reported by Normand, Cleveland, Langmore, Tacheron, etc.

Though it is hardly in accordance with the plan I have laid down for myself in this article to enter into anything like an extended discussion of the theories which have been advanced to explain the occurrence of the various phenomena of the disease, yet in this and certain other instances I shall depart from this rule. It must be remembered that though dealing

with a lesion which primarily generally involves one side of the brain, as a rule, we have one which tends in the majority of instances to ultimately directly affect both sides, blood confined to one ventricle being the rather rare exception than the rule. "The accumulation of blood in these cavities," Gendrin remarks (*Traité Philosophique de Méd. Prat.*, tome iii., Paris, 1838, p. 502), "may determine temporarily symptoms in relation to its seat in a single lateral ventricle, the compression consequently acting upon a single hemisphere; but the symptoms may soon be confounded in the general phenomena of an apoplexy, characterized by general suspension of the encephalic functions, resulting from a compression operating necessarily on the entire brain." Here we have a simple compression of the brain advanced to account for the loss of consciousness, but such a condition acting alone has long since been discarded as inadequate. In ventricular extravasation we have a more profound and universal lesion than in simple interstitial encephalic hemorrhage, and consequently would seem to be in a position to more easily comprehend why there should be partial or total abolition of consciousness. Simple pressure rapidly produced with consequent rapid induction of cerebral anæmia, as supposed by Niemeyer, would appear to receive a certain amount of support from such an extensive lesion as usually prevails in primary ventricular hemorrhage. Many arguments have been brought to bear against this theory, which need not be repeated here. In my own cases such a supposition is not borne out by the autopsical appearances, for in quite a large number of cases either meningeal or cerebral congestion, or both, were found. Nor do I think the so-called "étonnement cerebrale" of Trousseau, or the "cerebral shock" of Hughlings Jackson, furnishes a more applicable explanation. The disturbance of the equilibrium or proper relations of the various parts of the brain, each to each, requisite for the normal functioning, the destruction of one part, the squeezing of another, or the anæmia of one and the congestion of another, conditions which have been advanced by Jaccoud (*Path. Interne*, vol. i. p. 164), to explain the occurrence of coma, and elaborated by Hughlings Jackson, who, terming it "brain shock," believes (*A System of Medicine*, by J. Russell Reynolds, vol. ii., 2d ed., 1872, p. 546) that "the torn brain receives a shock on the side injured directly, and this is transmitted and reflected on the other side, and then there is produced the 'névrosisme,' which is apoplexy." Such a theory, it must be obvious, is incapable of general application, being only useful in the explanation of particular cases. Besides, as the result of hundreds of experiments on animals, Nothnagel pronounces against it.

I would offer the following theory, in as few terms as consistency will permit, which, though not of universal application, will, I think, apply in our case. It is known that a sudden blow or injury inflicted upon the circumflex nerves not infrequently arrests function, usually temporarily, inducing paralysis of the deltoid. A similar loss of function in the cells of

the solar plexus follows blows upon the epigastrium in a few cases, in fact death has been caused thereby, as in an instance by Sir A. Cooper, quoted in his lectures. In the experiment known among the Germans as the "Klopfversuch," the tapping experiment, by which blows delivered upon the belly of the frog over the solar plexus are made to induce vaso-motor paralysis, the cause lying in a deprivation of the controlling function of this plexus (Goltz); the blow renders the ganglionic cells inactive. It is also known that in concussion of the brain, where no positive anatomical lesion has as yet been found, consciousness is lost. Here the impulse of the blow received is transmitted through the bones of the skull to the brain, and loss of function results (Bruns, Fischer). A not uncommon instance of permanent death of a cell due to an injury is found in those instances, where, in the bones of the skull, without visible injury superficial necrosis takes place following blows by glancing or spent projectiles. Here the life is literally "knocked out" of the bone cells. Similarly, the soft parts suffer like effects. The blow or injury inflicted upon the cells of the cortex of the brain, governing intellection or consciousness, by a sudden lesion within its substance, causes an abeyance or abolition of their function which is loss of consciousness. In hemorrhage into the cranial cavity we have an injury or blow to deal with, the suddenness and extent of which determines the rapidity and degree of the subsequent coma. Such an explanation would apply as well to those cases where the loss is permanent as to those where consciousness is regained and again lost, the second attack of coma depending upon a recurring extravasation causing a new traumatism, the ganglionic cells being at first only temporarily deprived of their function by the blow inflicted upon them. Where the hemorrhage is into the ventricles we have the force of the blow transmitted to the cortex, which, covered in by the almost unyielding bony box, receives the brunt of the injury, and hence is most profoundly affected, its cells suffering accordingly. This theory, therefore, expressed in the fewest possible words, is, the nerve cells receive a blow which temporarily or permanently deprives them of their power of functioning.

II. *Motor Disturbances. Contracture.*—Since the time of Durand-Fardel early contracture, which is the form here referred to, has been considered characteristic, even almost pathognomonic, of the escape of blood into the ventricles or upon the surface of the brain. However, we now know this to be far from the truth, since it has been found present in cases of cerebral hemorrhage confined to the brain substance, in cerebral abscess, meningitis, and other pathological conditions. Among 8 cases of escape of blood from the substance of the brain externally upon the surface, there was 6 times contracture of the paralyzed side and once of the non-paralyzed members; while in 26 instances of primary meningeal hemorrhage contracture occurred in only 5, and always on the paralyzed side. Boudet among 41 cases of primary meningeal extravasation found this symptom

present 13 times. Thus among a total of 75 cases of meningeal hemorrhage, both primary and secondary contracture existed 25 times, that is 1 in every 3 cases. Among 18 cases of secondary ventricular hemorrhage Durand-Fardel observed this symptom either in the paralyzed or non-paralyzed extremities 15 times. Of the 94 cases of primary ventricular hemorrhage that I have collected, in only 48 was the history such that the presence or absence of this phenomenon could be established. In these 48 cases it was present 18 times, and of these in only 6 instances was the lesion found, *post mortem*, to be a simple uncomplicated extravasation. In 2 of these 6 cases the rigidity involved only the muscles of the lower jaw, causing trismus; in 1 an arm paralyzed by a previous attack of cerebral hemorrhage was affected; in 1 case there was contracture of both arms, trismus, with resolution of the lower extremities; and in 2 others the symptom was general, involving all the extremities. In the 12 other cases the complications were in 2, blood over the meninges; in 1, laceration and softening of the septum; in 2, laceration of the ventricular parietes; in 2, blood over the meninges and rupture of the septum lucidum; in 1, laceration of the fornix and walls of the ventricles; in 1, blood over the meninges and laceration of the fornix, septum, commissures of the third ventricle and slight tearing of the corpus striatum; in 1, blood over the meninges and laceration of the walls of the fourth ventricle; and in 1, tearing of the ventricular parietes (third and both lateral), as also of the fornix and part of the corpus callosum; and in 1 other, blood over the meninges with some laceration of the left lateral ventricle. Thus in 10 of these cases laceration more or less extensive existed at some point in the ventricular walls. In 2 of these 12 cases the contracture was confined to the muscles of the lower jaw, trismus, in 2 to the extremities of one side of the body, in 1 to the muscles of both arms, and in 7 it may be said to have been general, all of the extremities being affected. Thus we have in the 18 cases:—

	Times.
Trismus alone	4
Contracture of one upper extremity	1
“ “ both upper extremities	1
Trismus and contracture of both upper extremities	1
Contracture of the extremities of one side	2
“ “ all the extremities	9
	<hr/>
	18

In the four instances in which trismus alone was observed the anatomical lesions were so arranged that in every case irritation was brought to bear on one or both corpora striata directly. Thus in one case blood was found in all the ventricles, in two in both lateral and the third, and in the fourth patient in one lateral, the other lateral being filled by highly coloured serum, while the condition of the third ventricle was not stated. In two of these cases there was quite a large quantity of blood found at

the base, and in one the septum was also torn. Ferrier has shown that in rabbits, grinding of the teeth, but no true trismus, follows irritation of the corpus striatum, while the jaws become firmly clenched on stimulation of the anterior tubercles of the corpora quadrigemina. Whether or no the trismus in these cases is to be accounted for by a direct irritation, continuous in its action, of the corpora striata or tubercula quadrigemina is manifestly difficult to decide, but I am inclined to blame stimulation of the latter bodies. However, it is no more than fair to state that in many of the cases where blood was found in both the lateral and third ventricles all signs of contracture were absent. Why it should be present in some cases and absent in others cannot be determined, unless we suppose something more than the mere effusion of blood into the ventricles. In two of the cases of trismus convulsions coexisted at some time during the attack, both being instances of the form in which quite a large quantity of blood was found at the base.

In the patient in whom the contracture was confined to one arm, the left, this member had been paralyzed by a previous attack of cerebral hemorrhage. The arm is described as being "stiff and incapable of flexion," and it is also added that the day before the appearance of the symptom, the case having run over several days, the paralyzed side had been the seat of convulsive movements. The anatomical lesion consisted in an extravasation of about sixty grammes of blood into the left lateral ventricle. Here then we have lesion and symptom on one and the same side. Since crossed action is the rule, we must look for an explanation to the theory which considers contracture a reflex phenomenon. Perhaps this may be found in Bastian's statement that hemorrhage into one lateral ventricle may cause rigidity by irritation of the corpus striatum of the opposite side. In this case convulsion, as already mentioned, coexisted, without, however, any complicating condition.

Two patients were the subjects of contracture involving the extremities of one side of the body; in one no paralysis anywhere could be made out, while in the other this condition affected the left side, the right or non-paralyzed side being the seat of the rigidity. In both all the ventricles were found filled with blood, and in both there was some laceration of the ventricular parietes. In one, that in which the rigidity was present in the right or non-paralyzed extremities, a slight laceration existed over the posterior walls of the left lateral ventricle; while in the other, where the contracture was observed on the left side, the laceration was found around the right middle cornu. Thus in both cases the rigidity was on the side opposite to the seat of the laceration. Can it be that irritation radiating from these lacerated regions, possibly to the restiform body of the same side, produced the symptom? Duret found that the slightest irritation of one of these bodies was followed by *general* tetanic spasm; hence such an explanation is hardly to be entertained. Direct

irritation of one of the corpora striata might possibly be urged, but here it is to be remembered that in both cases all the ventricles were found filled with blood. In one of these two cases convulsions were present, but no blood had escaped externally.

Both upper extremities alone were the seat of contracture in only a single case, but in another patient this condition coexisted with trismus. These cases resembled each other in that in both blood was found in the lateral and third ventricles, but differed in that in one the blood was confined to the limits mentioned, whereas in the other it was also present over the entire convexity, the septum being also torn. In the former case there was coexistent resolution of the lower extremities, but in the latter no paralysis was noted. In the one direct irritation of the cortical motor centres for the arms might be supposed, but as in both an exactly similar ventricular effusion was found it would seem more probable to suppose a direct irritation of the nucleus caudatus of each side, or perhaps of the anterior tubercles of the corpora quadrigemina.

General rigidity or true tetanoid spasm of all the extremities existed in the largest number of cases, nine. Here the amount and seat of the extravasation varied greatly; in two cases being to a small quantity in both lateral ventricles only, in one of which the ventricular parietes were torn; in four in all the ventricles, one of these being complicated by laceration of the corpus striatum, septum, fornix, commissures of the third ventricle and the ventricular walls, as also by a small clot close to the upper part of the left restiform body, another by tearing of the walls of the third and both lateral ventricles and of the fornix and corpus callosum, while a third was accompanied by extravasation under the arachnoid over the medulla; in one patient the blood was found in the third and fourth ventricles, the fornix and ventricular walls being torn; in still another the blood existed in the third and fourth ventricles, some meningeal extravasation and laceration of the walls of the fourth ventricle coexisting; while in one other instance the hemorrhage was confined to the left lateral ventricle, but in connection with it great distension of the same cavity by serum was also found, the other lateral ventricle containing serum, though to a less degree. The lesions in most of these cases, it will be observed, were extensive, but differed markedly in the different cases, though in all but two both corpora striata were pressed upon directly; in six the lesion being such that irritation of the corpora quadrigemina can be demonstrated, while in two certainly the same could be shown of a restiform body, centres whose stimulation has been found to give rise to rigidity of the various parts of the body. In six of these nine cases laceration of the ventricular parietes was found; while in three true epileptiform convulsions coexisted at some time with the contractures, in none of which, however, had the blood escaped over the meninges.

It must be concluded, from the foregoing, that, as a rule, no direct rela-

tion can be traced between the seat, amount, and extent of the ventricular extravasation and the presence or absence of contracture. Why, then, should it occur in certain cases, and not in others? The answer to this question, I believe, will be found in the fact that more than a simple irritation from pressure within the ventricles is necessary for its production. Durand-Fardel believed that in secondary cases of ventricular hemorrhage, contracture was due to the laceration and gradual disintegration of the cerebral substance by pressure of the effused blood. Roberts seems to hold a similar opinion, for he affirms (*Pract. of Med.*, Phila., 1876, p. 836), that "if there is extensive laceration of the brain, rigidity and muscular twitchings are prominent." Todd entertained a like belief. We have seen with what frequency the symptom coexisted with secondary extravasation of blood into the ventricles dependent upon laceration occurring in 83.3 per cent. of such cases. Of my 94 cases, 36 were complicated, and of these 12 were marked by contracture more or less extensive; in 13 cases the symptom was entirely absent, while in 11 instances the clinical history was so imperfect as to be useless. The complicating condition in the 12 cases accompanied by contracture consisted in 10 of laceration of the ventricular walls; in 5 of these blood over the meninges coexisted, not confined to any particular region. In the two remaining cases, the complicating condition was blood over the meninges, being in both instances confined to the base. Of the 13 complicated cases unaccompanied by contracture, in 7 instances the complication consisted in escape of blood over the meninges, in 3 in rupture of the septum, while in the remaining cases there was slight laceration either of the corpus striatum or optic thalamus.

Of the 58 simple cases remaining, 21 may at once be put aside as useless on account of the absence of a clinical history, leaving 37 cases, in only 6 of which was rigidity observed. In this frequency of the coexistence of laceration with the occurrence of contracture, I believe there is more than a mere accident, although it cannot be positively shown that laceration always coexists with this symptom, since in a small percentage, it cannot be demonstrated, yet when we remember the likelihood of this morbid condition being overlooked, it would seem that its presence is almost a necessity, the more so when we consider the almost uniform occurrence of the symptom with the secondary form of ventricular extravasation consecutive to laceration of brain tissue.

Early contracture varies greatly as regards the time of its appearance. It may be immediate, occurring coincidently with or very soon after the beginning of the seizure, the immediate form; it may first be observed at a period varying from some minutes to several hours after the onset, but during the actual course of the disease, the intermediate form; or it may first show itself only a short time before death, the delayed form. Durand-Fardel in his secondary cases found that it was rarely present from the

beginning, most frequently appearing during the course of the disease. Among the 18 cases in which I find this symptom noted, it far more frequently appeared during the course of the attack than at its beginning or towards its close; thus in 3 patients it was of the immediate variety, in 14 of the intermediate, and in but 1 was it delayed, presenting itself in this instance but a few minutes before death.

With regard to its persistence, here also great differences are observed. It may be (1), merely transitory; (2), intermitting, partaking of the character of a true tetanus, general tetanic spasms appearing at more or less definite intervals; or (3), persistent, continuing uninterruptedly from the time of its inception up to or within a short time of death; and (4), interrupted, that is, the contracture may alternate with, precede, or follow epileptiform convulsions. In his cases Durand-Fardel often found the symptom a mere transitory one, observed only on repeated and careful examinations. This, he thinks, explains why it so often escapes observation; and in this we may possibly find an explanation for its being overlooked in the form of disease I am dealing with. According to Straus (*Schmidt's Jahrb. des Gesammt. Med.*, bd. clxxvi., 1877, s. 16, from *Thèse de Paris*, 1875), rigidity is often accompanied by convulsion of an epileptiform character, usually beginning in the paralyzed limbs. (Charcot.) Tonic spasms of one, two, or more limbs, following Bastian, may alternate with contracture, or there may be rigidity of the limbs of one side, with clonic spasms in one or both extremities of the opposite side. Resolution sometimes precedes, or at times follows the contracture, or the two conditions may co-exist in different members. In my 18 cases in none was the symptom reported as transitory, thus strengthening the suspicion that it was sometimes overlooked; in only 2 was it intermittent; in 10 persistent, and in 6 it was preceded by, alternated with, or followed by convulsions.

As has already been shown, contracture varies greatly in its seat and extent (see table, p. 345). It may simply involve a single muscle or group of muscles, or it may be so general as to be fairly considered almost universal. In the secondary form of ventricular hemorrhage, its usual seat is on the paralyzed side of the body, seldom on the non-paralyzed. Thus in 18 such cases Durand-Fardel found this symptom in 13 affecting the paralyzed, in only two the non-paralyzed members, while in the three remaining patients, there was simply resolution of the extremities. Hirtz expresses the opinion that if paralysis and contracture appear coincidently, the latter always affects the paralyzed limbs. I am unable to positively determine the bearings of this question upon cases of primary ventricular hemorrhage, since in quite a number of instances the clinical history is so very vague and imperfect, that the presence or absence of paralysis cannot be established, though as far as they go, they seem to show that Hirtz's rule is not of so universal application as he believed, while holding good, however, in the majority of cases.

Different degrees of contracture will be manifested in different cases, in some existing as a mere stiffness, hardly perceptible except on careful manipulation; or it may be so marked and extreme that the most powerful effort can scarcely overcome it, flexion or extension of the contracted member being next to impossible. Todd states that it may vary from an increased plumpness of the biceps of the arm and hamstring muscles and a resistance of these muscles to extension of the forearm and leg up to a contraction almost tetanic. He is here speaking of the symptom in its general relations. It is usually confined to one side of the body (Durand-Fardel), sometimes involves a single extremity and then almost always an arm, either the entire member, the forearm, or even the fingers alone; it is sometimes bilateral and partial, always involving symmetrical extremities; in such cases, as far as I am aware, always affecting the arms. It may involve only a single muscle or group of muscles; while rarely attacking the muscles of the face proper, it quite frequently seizes upon the elevators of the lower jaw, giving rise to well-marked trismus. As we have seen, the rule seems to be in the form of disease with which I am dealing for it to involve a large number of muscles, not infrequently all the limbs being the seat of the symptom. The rule is, that the flexors are more profoundly affected than the extensors, in this respect corresponding with the results of Ferrier's experiments, such being especially true of the upper extremities. In the lower extremities rigid extension is far from infrequent, as for instance in the case of primary ventricular hemorrhage coming under my observation.

Contracture, although an important sign of primary intraventricular extravasation, is far from characteristic or pathognomonic of it. Its presence should merely excite a suspicion of the existence of this peculiar form of intra-cranial hemorrhage, but in no instance ought a positive diagnosis to be based upon this symptom alone.

Convulsion.—It is claimed by Durand-Fardel that convulsions are much less frequent in rupture into the ventricles than contracture. Among his numerous cases of secondary ventricular hemorrhage he found this symptom present only six times. Hughlings-Jackson, on the contrary, believes that where blood breaks into the lateral ventricles (*loc. cit.*, p. 536), there is usually, not always, a convulsion. He further adds: "If a patient be first hemiplegic with or without unconsciousness, the subsequent occurrence of a severe convulsion followed by universal powerlessness and deep coma, is strong evidence of rupture into the ventricle." Nothnagel (*Cyclop.* by Ziemssen, vol. xii. p. 101, N. Y., 1877), considers convulsions to be especially frequent when the hemorrhage has broken through the floor of the fourth ventricle. Hirtz in his 77 cases of escape of blood into the ventricular cavity found convulsions in no less than 53 cases.

Convulsions I believe to be one of the most important and frequent symptoms of immediate ventricular extravasation. Of my 94 cases but

49 are useful in arriving at the relations of this symptom, and in 21 of these convulsions, more or less general, were present. In most cases the convulsions appeared early, not infrequently opening the attack; sometimes, however, first showing themselves during the course of the seizure, and in a few instances appearing late; death in such cases occurring during a convulsion. Thus in these 21 cases, they were early 15 times, occurred during the attack twice, and twice just before or during the death agony. They vary in degree and extent, from mere twitchings, tremblings, or tremors of a localized part or one or several extremities, up to a universal violent, epileptiform seizure. They may occur either at long intervals, or may appear every few minutes, or may even be almost continuous. In two cases the convulsive movements were confined to the paralyzed side, in one they affected the arm only, in another the face, leg, and arm; in a fifth they involved previously paralyzed lower extremities, while in one other case they were partial at first, but later became general. When the convulsions are general, which occurred in 16 cases, they approximate closely to the epileptic type, and like it are sometimes more marked on one side of the body than the other. This was especially noteworthy in one case, the convulsive movement being greatest on the paralyzed side. Complete coma almost always coexists with the convulsions, and these latter may sometimes alternate with contracture, sometimes precede it, or at other times follow or take its place. In 6 instances such was the case, in 3 the convulsion appearing with, in 1 following, and in 2 others alternating with this symptom. Brouardel thinks that convulsions occur in one-third of the cases where contracture is present in secondary ventricular hemorrhage, a proportion, as we see, about the same as in the primary form. In 11 of the 21 cases, the blood was in all the ventricles; in 4 in one lateral alone; in 3 in both lateral and the third; in 2 in both lateral only, and in 1 in the third and fourth ventricles. Pressure was thus brought to bear directly upon one or both corpora striata in every case but one, and upon the medulla oblongata in 12 cases. In most of these the blood was effused rapidly and to a large amount, so that the pressure was suddenly brought to bear upon the motor centres, and in this, I think, is to be found the explanation for the existence of convulsive manifestations in ventricular hemorrhage. A careful comparison of simple and complicated cases shows that the variety or extent of the complication has no essential bearing on the occurrence of convulsions, the ventricular extravasation itself being undoubtedly the inducing cause. One patient presented a peculiar motorial symptom somewhat analogous to that obtained by Nothnagel by irritation of his so-called *nodus cursorius*. The patient, a man, attempted to hang himself, but before life was extinct was cut down. As soon as he was liberated, he quite unconsciously rushed madly forward and fell. He lived three days, and after death extensive effusion was found in the ventricles,

with most intense congestion of the cerebrum, the cerebellum being scarcely affected.

Paralysis.—Paralysis as a symptom of primary ventricular hemorrhage is of quite frequent occurrence, and differs in no way from that due to ordinary interstitial, encephalic extravasation; whereas, judging from statements by various authors (Aitken, Hughlings-Jackson, Roberts), who seem to base their conclusions on the fact that the extravasation with its pressure-effects involves both sides of the brain, the impression is that the paralysis is much more extensive. However, as will be seen, such is not the fact. I find paralysis noted in 30 cases. The usual form is the hemiplegic, since of these 30 cases, 19 were of this variety, 11 being left and 8 right sided. Of the 11 remaining cases, of 4 it is said all the extremities were paralyzed; in 1 the diaphragm alone was involved; in 1 both lower extremities were affected only, the arms being the seat of contracture; in 1 the paralysis was crossed, the face being affected on the right side, the arm on the left; and in 4 the seat of the paralysis is not mentioned. It is here, especially in the hemiplegic cases, that a positive and direct relation can be traced between the lesion and the seat of the paralysis. In the 11 left-sided cases, the extravasation was in all either confined to or most abundant in the right lateral ventricle; of the 8 right-sided cases, in 5 the blood was found in the left lateral ventricle only, the three remaining cases being indefinite, but still in all of them the blood was found in both lateral ventricles. In the 4 instances in which the paralysis involved all the extremities, blood was present in all the ventricles in 3, and in the third and fourth alone in 1. The case of diaphragmatic paralysis was one in which all the ventricles were distended with blood, while in the patient in whom contracture of the superior with complete paralysis of the inferior extremities existed, the hemorrhage was found equally in both lateral and the third ventricles. The autopsy of the instance of crossed paralysis, *i. e.*, right side of face and left arm, is very imperfect, but shows abundant extravasation in the left lateral ventricle only, with a little serum in the right.

In only 1 of these 30 cases did the corpus striatum suffer laceration, and here no relation between the paralysis and the ganglionic lesion can possibly be traced, since the former was confined entirely to the diaphragm. However, in the 29 remaining cases absolutely no destructive lesion either of the motor ganglia or motor tract existed. Hence, destruction of neither the motor centres nor of the motor conductile fibres will explain the occurrence of the paralysis. I believe that the solution lies in the fact that some part of the central motor system, generally one of the corpora striata, was rendered inactive by the sudden excessive anæmia induced by the direct pressure upon it by the effused blood, thus having a condition produced analogous to that due to cerebral embolism. As we have seen, in almost every, if not every instance the paralysis was on the side oppo-

site to the greatest amount of effusion, or a close connection could be traced between them. In the few cases in which recovery took place the paralysis was more or less permanent.

In six cases resolution of the extremities is mentioned. This is a symptom of the gravest import, indicating early dissolution, since in these cases it only appeared several hours or immediately before death. It is also a sign of very extensive effusion, for in every instance the post-mortem showed all the ventricles to be distended with blood. It sometimes precedes, coexists with, or follows contracture, and at times alternates with convulsions.

The sphincter ani is noted as paralyzed in two cases, the feces being discharged involuntarily in bed. In three patients there was involuntary discharge of urine, while in two the opposite condition existed, there being retention necessitating the use of the catheter.

III. *Disturbances of Sensation. Sensibility.*—Sensation may remain perfect, even though unconsciousness be complete, or there may be anæsthesia. This latter differs in degree, time of appearance, and in some few cases varies at different times in the same case. When present, it usually appears almost coincidently with the seizure, and is then generally profound. It may continue uninterruptedly throughout, or may vary, at first being complete, later partial, or even entirely absent. Thus in one case, at first there was entire loss of sensation, with complete coma, but on the third day, pinching of the extremities was followed by movements of all the limbs, the patient rolling slightly over in bed; in another case in the beginning with complete loss of consciousness, there was absolute loss of sensation, giving place on the second day, with improvement in the general symptoms, to improvidence in this, but with recurring loss of consciousness there was again absolute loss of sensation. However, a direct relation does not always exist between the degree of coma and the degree of anæsthesia as might be supposed, for in several instances where the coma was complete, sensation remained intact. In every case in which there was anæsthesia, blood was found in both lateral and the third ventricles. I have no doubt that this symptom was often overlooked, my impression being that it is quite common.

Reflex Action.—In eight cases where reference is made to this point, the reflex phenomena were found more or less perfect in all but two. In all where it was present, the reflex movements were generally feeble, never violent, sometimes affecting the part irritated, at others all the extremities. In the two instances in which no reaction was obtained the patients were profoundly comatose, and on post-mortem blood was found in all the ventricles and very abundant. Nothnagel places the centre for the reflex process somewhere in the medulla oblongata. If this be so, abolition of reflex excitability should occur with pressure upon this part; in the cases with which we are dealing, with effusion into the fourth ventricle. In

only one of our cases in which this phenomenon persisted was blood present in this situation, and in this case the reflex movements were very feeble, appearing only in the legs and not in the arms, thus lending a certain amount of strength to the truth of Notlinagel's theory.

Conduction.—In my own case it was possible early in the course of the disease to determine the condition of conduction, and here it was good. In no other case can I find it referred to.

Giddiness or dizziness may sometimes appear as an early symptom, usually before the actual symptoms of the attack can be considered to have set in. In the five cases in which I find it recorded it was in every instance the first sign of impending trouble noticed by the patient, and was rapidly followed by the violent symptoms of the attack. Its principal peculiarity was the suddenness of its appearance. Cases beginning with this symptom are usually gradual in their onset, the symptoms as a rule not being very violent, and life is generally prolonged for some time.

Headache.—Cephalalgia when it occurs, and this it does with comparative frequency, always appears as an early phenomenon, either at the very beginning of the seizure, or soon after the first symptoms have made their appearance. It may be very slight or so intense as to cause the patient to cry out, in fact in several cases in which coma was present, the patient was observed to pass his hand over his head as if in pain. The character and seat of the pain vary greatly, having no special characteristics worthy of mention. The fact that headache appears early seems to bear no relation to the degree of violence or rapidity of the attack, nor does it seem to depend on the seat or extent of the ventricular hemorrhage. In all but four of the cases where it was present either free blood was found over the meninges, or these were the seat of marked congestion.

IV. *Disturbances of the Organs of Special Sense. Ears.*—In one instance, a case of hemorrhage into the third ventricle alone, the patient complained of buzzing in his ears. This is the only case in which any auditory symptom was noticed.

Eyes.—In a few patients the eyes are open and staring, in some the eyelids are closed. Out of five cases, the eyes were suffused in two; and in two the eyeballs were described as rolling in their sockets, in both the symptom appeared, however, only a short time before death. The condition of the pupils varies greatly. In eight cases they were equally contracted; in four equally dilated; in two one pupil was contracted, the other dilated. In three cases the reaction to light was good, but in five others there was absolutely no reaction, these, however, being all cases of profound coma. We thus notice that there is nothing characteristic or certain in the condition of the pupils; though I have been able to trace a direct connection between the seat of the hemorrhage and the state of these latter. In all cases in which the pupils were either equally dilated or equally contracted blood or serum was found so disposed in the ventricles

as to give rise to irritation or pressure upon both sides of the brain. Thus in the four cases in which the pupils were uniformly dilated blood was present in all the ventricles; and in the eight instances where they were equally contracted, in three the hemorrhage involved all the ventricles; in two both lateral and the third, in one the third and fourth; serum filling the two lateral; in one one lateral, the other lateral containing a sero-sanguinolent fluid, and in one a lateral and the third and fourth ventricles, the remaining lateral containing serum. In the two instances in which one pupil was dilated while the other was contracted, blood distended one lateral ventricle only in one, and one lateral and the third in the other, the dilated pupil in each instance being on the same side as the lateral ventricle in which the blood was found. The condition of the pupils may vary at different times, being, perhaps, contracted at one examination, while at another they may be dilated, the rule, however, being seemingly that they remain the same throughout. The degree of contraction also differs greatly, varying from a pin's point up to a degree which is hardly observable. The same is true of the dilatation. When insensibility to light exists it is absolute, at least it was so in the five cases mentioned. In only one patient was strabismus noticed, and here it is mentioned as being merely transient, appearing and disappearing at intervals. Conjugate deviation of the eyes, which according to Bastian is sometimes present from the first in cases of secondary ventricular hemorrhage, I find recorded in no instance of primary hemorrhage, but in two cases lateral deviation of the head (a condition which, according to Prevost is often associated with lateral deviation of the eyes) was noted. The latter author considers this symptom characteristic of lesion in or near the corpus striatum, but Hughlings-Jackson affirms that it also occurs with meningeal hemorrhage. Ferrier found in rabbits that rigid rotation of the head to the opposite side followed irritation of one corpus striatum, thus lending support to Prevost's supposition. In the two cases above referred to the condition of the eyes is unfortunately not alluded to. In both blood was found in the lateral and third ventricles, and in both the septum lucidum was destroyed.

Speech.—Loss of speech may be partial or complete, varying from a mere inability to articulate clearly to complete aphasia. In eleven patients, although they were known to be sufficiently conscious to comprehend what was going on about them, and to understand questions put to them, symptoms referable to defects of speech were present, in some existing as a mere difficulty in clear utterance, in others as a partial loss of the power of speech, answers being in monosyllables as “yes” and “no,” in one case, and “well” and “oh dear” in another. In both these cases the aphasia finally became complete. In several patients the loss of speech was absolute from the beginning. Whether these symptoms are directly related to the seat of the lesion, or secondarily through lingual paralysis,

I am unable positively to determine, but I am inclined to believe that it is dependent upon the latter condition. In two remaining cases the voice was stammering.

V. Disturbances of the Alimentary Canal. Mouth.—Frothing at the mouth, which is an occasional symptom in other forms of intra-cranial hemorrhage, is here comparatively frequent, for in ten cases a frothy material, varying in character from a simple mucus up to a blood-stained saliva, gathered about the lips or in the buccal cavity. In three the collection occurred during convulsion, the instance in which it was bloody being one. In only six cases is it stated that the mouth deviated. In two others the patient lay with the mouth open, both being instances of deep coma.

Tongue.—In only three cases is the condition of this organ mentioned, and in only one of these did it on protrusion deviate. In the other cases it is described as being simply dry in one, and as being tremblingly and slowly protruded in the other.

Deglutition.—In the large majority of cases the patients were able to swallow freely throughout the entire course of the attack, but in four, difficulty or absolute inability of deglutition existed at some time, in one patient only appearing early, and in this case the blood was found in all the ventricles, while in the others the fourth ventricle was free, in these the symptom only appearing a short time before death and coexisting with profound coma.

Sickness or Malaise.—Early in the attack, usually as an ushering-in phenomenon, this symptom was noticed in three cases, in none, however, existing to anything like an extreme degree.

Nausea and Vomiting.—In twelve cases either one or both of these symptoms were present, usually early, sometimes at the very beginning. In two, nausea alone appeared. The vomited matter varied in character from the contents of the stomach to a bilious material; in some it was slight, in others recurring and persistent. In one instance, it bore a close resemblance to ordinary cerebral vomiting, evacuation of the stomach without previous nausea taking place, on the patient raising her head in bed.

Constipation.—Like as in other cerebral affections constipation is the rule, in three cases being so aggravated as to require artificial evacuation by enemata.

As will be seen, the symptoms referable to the alimentary canal are of but little importance in the diagnosis of the disease under discussion.

VI. Circulatory Disturbances. Pulse.—It can hardly be said that there is any form of pulse which is characteristic of primary ventricular hemorrhage. Still, in many cases, we meet with a certain similarity approximating to this condition. It varies in the different stages, the pulse of the early period differing greatly from that of the later stage.

Immediately following the onset or within a few hours thereafter, we find a slow, full, strong, usually regular pulse, in fact, a pulse which has come to be regarded as indicative of intra-cranial mischief. Sometimes it is soft and small from the beginning, at other times rapid, and at others irregular and intermittent, this latter form occurring coincident with symptoms of collapse, and is to be considered as rather dependent upon this condition than on the hemorrhage. Later on the pulse gradually changes from its cerebral type, becoming rapid and weak, then feeble, then irregular and intermittent, and finally almost imperceptible, thus showing a slow yet steadily increasing loss of heart power. The pulse varies greatly in frequency, in one case falling as low as 40 beats in the minute, in others rising as high as 152. In some cases it remains about normal throughout, never going above 80 beats per minute. The slow pulse appears early, whereas in the three cases in which 120 or more pulsations were reached this only occurred just before death. A comparatively high pulse is, therefore, of bad import. The soft pulse occurs but rarely, having been noticed in but two instances. The slow pulse is mentioned in eight cases, in every one appearing early; in nine patients the pulse was full; in three strong, and in ten rapid. The irregular and intermittent pulse appeared in eight cases, usually late, but in two of these at least early, both, however, being instances of collapse. On reaction, in both, the pulse became full and tense or more developed.

The pulse, therefore, which may be considered as characteristic of primary intra-ventricular hemorrhage in the early stage, although strictly speaking it is no more distinctive of this than of any other form of intra-cranial disease, is the slow, full, hard pulse; while later, when the powers are becoming exhausted, it becomes rapid and feeble. As already stated, in a few cases it remains normal throughout. In one case the pulse continued some minutes after the cessation of respiration.

VII. *Disturbances of Respiration.* *Respiration.*—In 28 cases the state of the respiratory function is given, and in all but five it was more or less stertorous at some period of the disease, the stertor in the majority of cases (17) appearing early, in six instances only occurring late. It varies in degree in the different cases from slight puffing to loud noisy breathing, in some gradually increasing, in others being at its greatest from its inception. In a few instances instead of increasing it slowly diminished, as in one case giving place to a slow irregular yet quiet respiration. Of the five remaining cases, in one it is described as regular and normal throughout; in two as simply difficult; in another as very shallow and slow, but regular and equal; and in a fifth as quickened, being 36 to the minute. In one patient in whom stertor existed, the respiration was also hastened, reaching 45 per minute. In three cases it was slow; in three irregular; in one there was complete paralysis of the diaphragm, respiration being wholly thoracic, whereas in another instance, the con-

trary prevailed, distension of the chest cavity being only carried on by the diaphragm. In one case respiration actually ceased some minutes before the pulse, this being the one in which diaphragmatic paralysis existed, a condition which I have seen simulated in a case of fracture at the base of the skull with extensive meningeal hemorrhage. In another patient, a short time before death, stertor alternated with entire suspension of the respiratory act. In such cases we would expect, reasoning from physiological principles, pressure upon the medulla oblongata so acting as to involve the respiratory centre, and in those where cessation of respiration preceded that of circulation, this centre before the circulatory centre. In these patients the fourth ventricle was invariably found filled with blood.

VIII. Temperature. *Chilliness or sense of coldness* is spoken of as present in two cases, in one being described as the very first symptom appearing, and in the other among the earlier signs of the seizure. In neither case did it amount to an actual chill, but in the second patient it was accompanied by shivering.

Temperature.—In only a few patients was reference made to the body heat, and in these few so indefinitely that but little can be deduced therefrom. In four cases it is mentioned of the extremities that they were cold, this coldness being noticed, however, only a few hours before death. In a few others the skin was observed to be cold. Such cases are of but little or no importance, as they establish nothing. In three cases the history states that the body heat was natural, but as the thermometer was not used, such statements can hardly be received. In only six cases was fever observed, and in only one of these, my own, were thermometrical registrations obtained. Of the other five it is merely stated that the patient suffered from fever more or less marked. In my own case, the temperature obtained was as follows. On admission to hospital, Sept. 26th, being the second day of the disease, the temperature being taken in the rectum, $101\frac{1}{2}^{\circ}$; September 27th, A. M. 100° , P. M. 101° ; September 28th, A. M. 102° , P. M. 102° ; October 2d, P. M. 103° . Here we have at first a slight elevation followed by a slight fall, not, however, reaching the normal, then a second steady uninterrupted rise up to the time of death. Whether there was an initial fall immediately after the seizure, as observed by Bourneville in cases of ordinary cerebral hemorrhage, I am unable to determine; but in other respects the temperature curve is exactly that obtained by him, that is, death being delayed several days, the initial fall is followed by an almost stationary period, and finally, a stage of great elevation continuing up to death. One case, however, can hardly be said to prove anything, and further observations are therefore necessary. Speaking of secondary cases following hemorrhage into the corpus striatum or optic thalamus, Bastian (loc. cit. p. 649) states that in each a decided fall in the temperature occurs (as low as 96° in the rectum or thereabouts), remaining so for an hour or two, especially where

the hemorrhage into the ventricles continues. If death does not speedily follow, we then have a rapid rise continuing until death. Dieulafoy (*Gaz. Hebdom. de Méd. et de Chir.*, 20 Avril, 1877, p. 270) finds in secondary cases an elevation of temperature which remains until death.

IX. *Disturbances of the Urinary Apparatus.*—The symptoms referable to this system of organs are unimportant. The retention or involuntary discharge of urine has already been referred to. A number of cases were marked by the presence of albuminuria, but this was found on post-mortem to be due to organic kidney changes.

X. *Surface Symptoms. Expression of Countenance.*—This seems to be the dull apathetic type, since in the three cases in which it is described it was of this character.

Condition of the Surface.—Paleness of the face is a symptom of ill-omen, especially when it occurs early. It is noted as present in seven cases, six times appearing early, once late; in the former cases life in no instance was prolonged beyond twelve hours, while in the latter this symptom only made its appearance a short time before death. In eight cases the face is described as congested, red, flushed, or dusky, this state showing itself early in all but one of the cases. In such patients life was usually prolonged for several days. Coldness of the hands and feet or of the entire surface of the body was present in ten cases, in all early. Death in these cases, as a rule, soon took place, though it is not a symptom of as bad import as paleness. In one patient the *tâche cérébrale* was evident, though not marked, and in another, on the second day, death taking place on the third, the body was bathed in a profuse perspiration. Sweating also occurred in several other cases.

XI. *Apparent Improvement.*—It has long been the belief that cases of secondary hemorrhage into the ventricles are marked by a period of apparent improvement, this period being presumed to indicate a temporary cessation of the extravasation into the brain substance, preceding the eruption of the blood into the ventricles, which latter event is supposed to have occurred when sudden complete coma, contracture, paralysis, etc., present themselves. Such a presumption can hardly be the entire truth, for, I find in ten of my primary cases a similar interval of seeming improvement. This I would explain on the ground that for the time the hemorrhage having ceased, the brain has accustomed itself to the pressure, and functioning is partially or completely restored, the improvement varying from that which is very slight to a perfect restoration of consciousness. A second hemorrhage occurs and relapse follows. In every one of the ten cases the improvement was merely transitory and in every instance was followed by symptoms of the most aggravated kind, persisting uninterruptedly until death, no second remission being observed in a single case.

ARTICLE IV.

EXPERIMENTAL STUDIES ON THE TRANSPLANTATION OF CARTILAGE. By T. MITCHELL PRUDDEN, M.D., Director of the Physiological and Pathological Laboratory of the Alumni Association of the College of Physicians and Surgeons, N. Y., Lecturer on Normal Histology in Yale College, Pathologist to the Manhattan Eye and Ear Hospital.

THE question of the origin of pus, or of new cells within adult tissues under pathological conditions, although for many years a theme of the most lively interest, yet first became capable of precise discussion and investigation upon the definite enunciation of the principles of the cellular pathology by Virchow, now somewhat more than two decades ago. In accordance with the principles formulated with such precision, and maintained with such learning and enthusiasm, and with the facts then at his command, it seemed, indeed, beyond a doubt, that where larger or smaller groups of new cells appeared in the tissues, where fewer or only one were wont to be, he was justified in assuming, as he did, that these were the direct offspring of the original cell or cells.

This position, however, was soon shown not to be as impregnable as it seemed, for in 1863, Recklinghausen showed, what Virchow had never dreamed of, that certain cells possessed the capacity of changing their position in the tissues, of wandering; and it was soon demonstrated that there were communicating spaces in the tissues through which these wandering cells could, and did find their way, and that these spaces were in many cases just those in which the proliferating cells of Virchow lay.

It was not long before Cohnheim, repeating a forgotten experiment with such directness of purpose and significance of conclusion, as to entitle him to all the credit of an original discovery, found out where such wandering cells could come from—the bloodvessels. After this, whenever such abnormal collections of cells were found in the tissues, two possibilities, instead of one, presented themselves as to their origin; they might be the offspring of cells belonging in the tissues in question, or they might be cells or their offspring which had come in from somewhere else, most probably from the bloodvessels.

And still, to-day, notwithstanding the many most elaborate and painstaking investigations which have been made for the direct purpose of determining which of these two factors, the “fixed cells” on the one hand, or the “wandering” or white-blood cells on the other, are most concerned in the production of new cells in the tissues, under varying conditions, and especially in that complex of phenomena commonly known as inflammation, the old alternative, in many cases, persistently presents itself, and we are unable to give an absolute decision.

Most observers are, indeed, convinced, that under differing, or often the

same, conditions, both sources of origin of the new cells should be recognized, but are not able to decide, in many special cases, which is the more important. It might seem that with such a degree of unanimity of opinion, the absolute decision of this question in particular cases is of little importance, and this, from the so-called practical stand-point, may, perhaps, be true, but from the broader stand-point of biological science, it is of the extremest significance, because it has to do with the determination of the capacities of several varieties of that material in which life finds expression and which is somewhat loosely called protoplasm.

If many years of patient investigation have not brought to us a simple and precise formula, in which the great group of changes usually huddled together under the name of inflammation can be adequately expressed, this is not the fault of the investigators, but is owing to the complexity of the theme, and it is a most encouraging circumstance that the more fascinating labor of generalization should be for the moment withdrawn from the front, while incalculable pains are being taken to elicit, without direct reference to their ultimate application, and from various and sometimes obscure and unpromising sources, those simple facts in the life-history of cells without which all great generalization on this theme must ever be somewhat premature.

At the present time the determination of the proliferative capacities of special forms of cells, and their power of being directly converted into the cells of other forms of tissue under changed conditions, would seem to promise more definite results, in view of their ultimate application to the inflammation question, than attempts at a direct solution of the general question of the origin of pus.

Two varieties of tissue have seemed, from the very first, to be better adapted than others for the investigation of this subject, because both seemed comparatively simple in structure, and both were without blood-vessels; these are the cornea and the hyaline cartilage.

In the earlier days of the discussion, following Cohnheim's discovery, it was to the cornea that most attention was directed, and many facts of inestimable value which have been elicited attest to the skill and devotion given to this object. Still the definite answer remains in abeyance; for, in the first place, the cornea appears, on closer investigation, to have by no means the simple structure at first assumed. It is permeated by numerous communicating lymph-spaces, in which the corneal cells lie, and through which white blood- and other cells can wander; and the exact shape and character of the corneal cells it is very difficult to discover. These cells, moreover, under the same conditions in which an increase of cells occurs, are subject to certain degenerative alterations which it is sometimes almost impossible to distinguish from active proliferative change. The commonly employed method of staining with gold chloride, introduces still again elements of uncertainty which force us to accept

conclusions drawn from corneæ treated in this way, with considerable reserve. So that it is not strange that of late the cornea has been less frequently the object of research, and more attention has been devoted to the cartilage.

While some plausible objections may be urged against this tissue as a medium of investigation of inflammation, such as the assumed indolent character of its cells, and the firmness and unyielding nature of its basement substance, which would tend to retard the reaction of its cells against irritative agencies, etc., these are at best of a negative character, and are quite overbalanced by the positive advantages which it presents. Its structure, in the first place, is quite well known, and, what is very important, simple in character; and although the existence of delicate lymph-channels between the cells has been urged of late, with no small degree of reason, they are, even if they exist in the abundance assumed by some authors, so very small as to exclude the possibility of the passage through them of the white blood-cells or other wandering cells. The cartilage-cells, moreover, have been shown to be by no means incapable of considerable active change under suitable conditions.

It is not the purpose of this article to give even a *resumé* of the experimental researches on cartilage, but to record a series of experiments performed upon it, not with direct reference to the inflammation question, but with the view of determining the vital capacities of its cells when placed under certain abnormal conditions, capable of variation and control.

The desirability of research of this character was suggested by Prof. Julius Arnold to the writer some time ago, while a student in his laboratory in Heidelberg; and he wishes to express here his gratitude to his teacher for the suggestion of the theme as well as for the judicious and inspiring counsel so cordially given him during the early part of the investigation.

It was originally designed to limit the work to the cartilage of the frog, and the simple question was propounded, "What changes are to be observed in bits of hyaline cartilage, from the frog, when placed in the subcutaneous lymph-sacs of a living frog and left for varying periods?"

The very simple operation required, was performed on a considerable number of animals, the fragments of cartilage being transferred at once from a freshly-killed frog to the various lymph-sacs of other living frogs. These were removed after having been within the sacs for periods varying from two to forty-four days, and preserved, some in Müller's fluid, some in osmic acid, and some stained with gold chloride. The fragments were found, for the most part, lying free and unattached in the lymph-sacs, and presented in thin sections nothing but the usual degenerative changes produced by longer or shorter maceration in indifferent fluids. In a very few cases, however, the fragments were found inclosed in granulation-tissue, and attached either to the skin or to the muscle-bellies or fasciæ.

The minute changes observed in such fragments will be mentioned further on, it being undesirable to give a full description of them here, since the cases in which anything but absolutely negative results were obtained were so few, irregular, and long delayed, that it soon became evident that neither the probable duration of the life of the investigator, nor the average life of frogs, would suffice for the solution of the problem in this form.

Some control experiments, however, performed on rabbits, gave indications which led to the hope that the warm-blooded animals might afford a more satisfactory answer to a similar inquiry; and, in fact, the results, now to be recorded, of experiments on rabbits, instituted at a later time, and extending over a period of two years, show that this hope was not without foundation.

The question propounded in the latter series was equally simple. What changes, if any, occur in fragments of hyaline cartilage, transferred directly from a freshly-killed rabbit, to the subcutaneous tissue of a living animal of the same species, and left for varying periods; and further, how do such changes differ from those observed when cartilage whose cells are dead, is subjected to the same conditions?

Somewhat similar questions have indeed been partially answered so far as the general fate of such transplanted fragments is concerned, by Ollier, Bert,¹ and others, but the need of a more detailed and microscopic analysis seems to justify its renewal. In this investigation therefore especial attention was paid to the comportment of the cartilage-cells.

Methods of Investigation.—These were of the simplest character. Very small fragments of hyaline cartilage—thin pieces from the head of the femur, or from the costal cartilages, were taken from a freshly-killed rabbit, great care being exercised that no perichondrium remained adherent, and were thrust immediately into the subcutaneous tissue of a living rabbit, through a small incision in the skin. Careful records were made of the position of these fragments, and the incision closed by silk sutures. Antiseptics were not used, but the most scrupulous care was observed in the cleanliness of the instruments, and the exact closure of the little wounds, the edges of the latter being everted before drawing together, so as to insure the apposition of raw surfaces. The wounds, almost without exception, healed by first intention, and in no case did the animals exhibit any evidence of constitutional reaction, even when a number of insertions were made at once. In cases of momentary delay, between the removal of the cartilage from the dead animal and their transference to the living one, the fragments were placed in a half per cent. solution of sodium chloride, kept at a temperature of about 38° C.

In this way the *living* cartilage was transplanted. For purposes which

¹ Ollier. *Traité Experimental et Clinique de la Régénération des Os*, etc., 1867, t. i. Bert. *Sur la Greffe Animale*. *Comptes Rendu de l'Acad. des Sciences*, t. 61, p. 567.

will presently be evident, the cartilage-cells in some cases were *killed* before insertion into the living animal; but the same care was in all cases observed in the conduct of the operation, in order to insure uniformity of conditions. The killing of the cartilage-cells was accomplished in a variety of ways. Some bits were simply dried for several hours on a plate of glass at ordinary temperatures; others were soaked for several hours in strong alcohol, others in a saturated alcoholic solution of carbolic acid; still others were kept for several minutes at the temperature of boiling water; and finally in some, the end was accomplished by the protracted passage through them of a strong interrupted current.

On removal, after varying periods, the fragments of cartilage, or what remained of them, or the tissue replacing them, were placed at once in Müller's fluid, subsequently in alcohol, and thin sections were stained first lightly with hæmatoxylin, and then deeply with eosin and mounted in glycerin. This simple method of double staining cannot be too highly commended for such studies as these, for the eosin exhibits so exquisite a selective power for the cell-bodies—in branching cells for their finest ramifications—that it rivals even gold chloride, in many cases, in the clearness of the pictures elicited, and does not seem to share its well-known imperfections.

More than two hundred bits of cartilage were inserted at different times, and were removed at periods varying from 1 to 399 days. Thin sections were made from all of these, and from many of them a series of consecutive sections. Altogether, about twelve hundred sections were prepared and studied. This large number of specimens rendered the study of the consecutive stages of the absorption process quite complete, and will justify a much more definite, positive, and condensed description of it than would otherwise be permissible.

The fate of such bits of cartilage, in which the cells are either living or dead, is in brief as follows: at first a greater or smaller number of small spheroidal cells collect around them; the bloodvessels in their vicinity become dilated, and within a few days—sometimes within a few hours—they become inclosed in a larger or smaller mass of granulation-tissue whose bloodvessels may be readily injected from the aorta. From this period the course of affairs is subject to considerable variation.

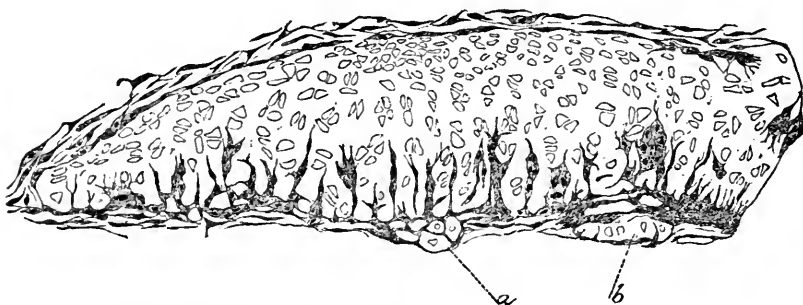
While the inclosing granulation-tissue becomes in all cases denser and firmer, and gradually assumes the character of young fibrillar connective tissue, the inclosed cartilage may remain almost absolutely unchanged for weeks and months, the living cells retaining their normal character most perfectly; or, on the other hand, it may commence to disappear almost immediately after its insertion, and in a few weeks be entirely absorbed, its former seat being indicated only by a small nodule of new connective tissue, which, itself, finally disappears. The long persistence of the bits

is more apt to occur in fragments inserted with the cells yet living; still such fragments not infrequently disappear very soon. The writer was unable to note any fixed conditions which seemed to determine the rapid or slow absorption of the fragments.

In only one case was there any actual new formation of hyaline cartilage, and this was in the form of a nodule so small as to be evident only in a microscopical section. The bit of cartilage from which this new growth of cartilage occurred, was from an adult animal, and the new cartilage was distinctly embryonal in structure, the cells being closely packed together with a little characteristic basement-substance between them.

In considering the microscopic changes observed in the process of absorption, it will be convenient to describe first those which occur in bits of cartilage in which the cells were dead when inserted beneath the skin. It is not necessary to describe in detail the appearance of the cartilage-cells under these conditions, since they are familiar to all. The absorption in these cartilages takes place entirely from without, there being, as would be expected, absolutely no reaction on the part of the cartilage-cells, no matter how long the fragments remain in the living animal. The absorption occurs by means of a growth inwards of cells which are collected around the cartilage, the basement-substance of which becomes at

Fig. 1.



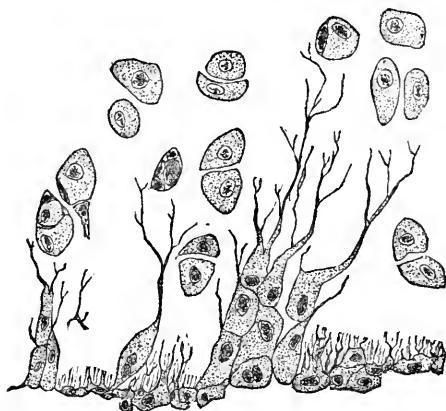
Shows a transverse section of a bit of cartilage from the head of the femur, in which the cartilage-cells were killed before transplantation, by soaking for an hour in a saturated alcoholic solution of carbolic acid. It was removed on the forty-first day.

the same time, finely but distinctly fibrillated. The ingrowing cells seem to channel their way in the basement-substance as they go, assuming as they do so either long, pointed, or bizarre branching shapes. They sometimes work their way into the cavities in which the shrunken and dead cartilage-cells lie, but in most cases they seem to avoid these, advancing between the cells along the boundaries of the so-called "cell territories," thus often forming a cellular reticulum in the meshes of which lie the

dead and shrunken cartilage-cells, each surrounded by a more or less spheroidal mass of basement-substance, presenting the appearance seen in Fig. 1, *a* and *b*.

Thus gradually the whole piece of cartilage may be permeated by cells or cell-masses, growing in from the surfaces, and sooner or later these are accompanied by bloodvessels which can be easily injected from the aorta. The fragmentary remnants of the cartilage now soon disappear, leaving behind a tissue resembling mucous or embryonal tissue, which by little and little assumes the character of ordinary adult connective tissue.

Fig. 2.



Shows a portion of a bit of cartilage transplanted with the cells alive and removed on the forty-first day. Ingrowth of cells from the surface. Commencing proliferation of cartilage-cells within.

The branches which the active cells at the surface send into the cartilage are often extremely long and delicate, similar to those shown in Fig. 2.

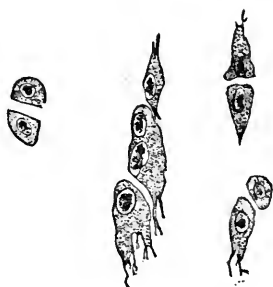
The above described process of absorption was the same in all the cartilages, no matter in what way the cartilage-cells were destroyed beforehand, except that in the boiled fragments, the disintegration of the basement-substance was more speedy and the resolution into cell territories more marked than in those treated in other ways.

Strikingly in contrast to these are the pictures which those specimens present in which care is taken to preserve the cartilage-cells alive; for while the same absorption occurs at the surfaces by ingrowing cells and bloodvessels, here the cartilage-cells themselves play, in the most unmistakable manner, a very important part, by changing their shape, by proliferating, and by absorbing the basement-substance in their vicinity. These three modes of expressing their activity, can be best appreciated by reference to the figures. The general character of the change in shape—

which very often occurs without, at first, any tendency to proliferation, but which is necessarily associated with absorption of the basement-substance—is shown in Fig. 3. The cells may become elongated, or may send out processes, which, at first short and often ragged, grow larger and longer and better defined, until a complete irregular network may be formed entirely within the substance of the cartilage, at considerable distances from the surface, and quite independent of any change which may be occurring there.

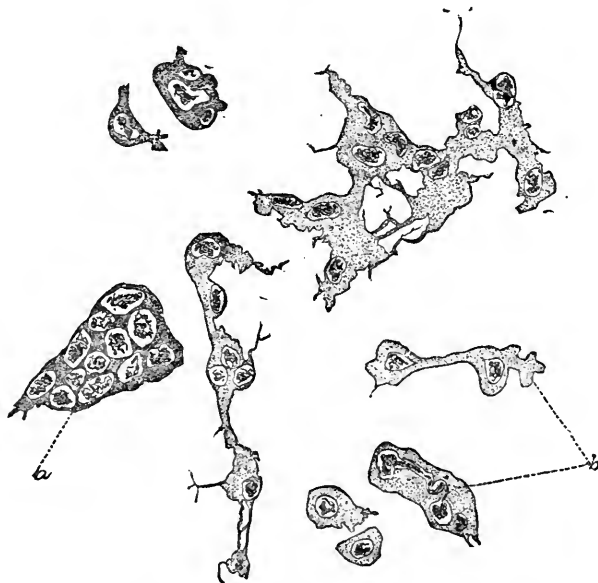
When so much channelling of the basement-substance has occurred as this change in the shape of the cells involves, proliferative changes usually appear, and then in place of a simple cellular network, there are larger and smaller clusters of cells at certain points joined together by cell-processes.

Fig. 3.



Cells transplanted alive; commencement of change of shape. 131st day.

Fig. 4.



Transplantation with cells living. Proliferation and channelling of the basement-substance. *a.* Enlarged cavity containing numerous nuclei without differentiation of cell-bodies. *b.* Elongated cells showing changes in the nuclei. Removed on the 82d day.

Not infrequently, the first active change in the cartilage-cells consists in proliferation; the regular cavities in which the cells lie becoming simply and symmetrically enlarged, but at first not at all branched. Later,

some of the newly-formed cells in the cavities may be seen to have commenced sending out processes, which work their way through the basement-substance, and thus the various cell-groups are finally connected together, and we have a cellular network, with cell-clusters at the nodal points and with irregular fragments of cartilage basement-substance in the meshes, presenting a picture like that represented in Fig. 4. Although, at first sight, the cellular networks thus formed seem to resemble those produced by the ingrowing of branched cells from the surface, a more careful examination shows a striking and fundamental difference. In the former case, where the cartilage-cells are dead and entirely inactive, the channelling of the basement-substance occurs, in the great majority of cases, between the cell territories, leaving in the meshes of the cell-net the shrunken cartilage-cells surrounded by a greater or less amount of basement-substance; whereas in the latter case, where the activity is in the cartilage-cells themselves, the fragments of basement-substance are entirely devoid of cartilage-cells or old cell-cavities, and are much more irregular in shape.

This difference was strikingly shown in fragments in which the cartilage-cells over a limited area were killed, while others near them were left alive. This was accomplished by thrusting a red-hot needle through thin bits of freshly removed cartilage, by which means the cartilage-cells in a narrow zone around the hole were destroyed. The bits were then immediately inserted into the living animal in the usual way. After remaining until the process of absorption was sufficiently advanced, thin sections passing through the opening and both zones, reveal, as above stated, the contrast between the two modes of absorption, in the most striking manner. The opening made by the needle is in such cases filled by young connective tissue.

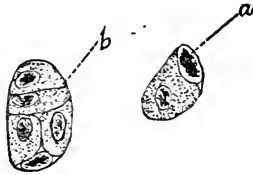
Very soon after the cartilage becomes permeated by the cell-network, in whatever way it may have been developed, the basement-substance entirely disappears, and the whole assumes the character of embryonal fibrillar connective tissue.

Let us now examine more closely the earlier stages of proliferation in the cartilage-cells. The first change observed was a division of the nuclei. The precise manner in which this occurs, although carefully sought after in a great number of apparently promising preparations, was not satisfactorily ascertained. In many nuclei, in regions in which proliferation was evidently occurring, a considerable increase in the bulk of the fibres of the intra-nuclear network was observed, and occasionally a definite grouping of these fibres into more or less conical rayed figures at the opposite poles of the nucleus; but between the forms and the perfect, newly developed nuclei, definite intermediate forms were not found. The newly formed nuclei were sometimes inclosed in the body of the cell, but in a great

many cases were seen lying completely outside of the latter and pressed closely up against the capsule, in the manner shown in Figs. 2 and 5.

In many cases there was a distinct new formation of separate cells within the enlarged cavity, Fig. 5, *b*; in others there seemed to be simply a

Fig. 5.



a. New formation of nucleus. *b.* New formation of nucleus and separate cells. 41st day.

multiplication of nuclei, but no differentiation into separate cell-bodies. (Fig. 4, *a.*) When completely developed cells were formed they were in no case separated by the formation of a partition of basement-substance across the cavity, such as is observed in the proliferation of cartilage-cells under normal conditions; for example, in growing cartilage in the young animal.

In a considerable number of cases the enlarging cells were very much elongated and bulbed at the ends, and the nuclei at each end were joined by a narrow, often curved or twisted structure resembling the nuclei themselves; or appeared to have been recently separated. See Fig. 4, *b*.

These active changes in the cartilage-cells are usually unassociated with fibrillation of the basement-substance, which is so constant an accompaniment of absorption from the surfaces.

In cases in which there was calcification of the cartilage, as in some of the costal cartilages, the cells causing the absorption at the surface were associated with many extraordinarily large and irregular-shaped giant-cells.

The cells near the perichondrium usually show apparent proliferative changes earlier than those lying more deeply; but here the difficulty of absolutely excluding the possibility of cells coming in from outside sources would suggest the propriety of laying but little stress upon this point.

The above-mentioned cartilages from the frog, in which changes were observed, presented pictures similar to those in the rabbit's cartilage in which the cells were killed before insertion, the absorption in all cases occurring by means of cells growing in from the inclosing granulation-tissue.

Conclusions.—These experiments show that in the rabbit the cells of bits of cartilage transplanted alive, may live on unchanged in their new situation for many months; or, that they may lead to the new formation

of embryonal cartilage; or, that they may, on absorption of the basement-substance, change their shape and size; or, that they may undergo active proliferation, and take part directly in the formation of young forms of connective tissue, similar to those produced by cells from other sources. They show, furthermore, that bits of cartilage in which the cells are killed before transplantation, may be entirely absorbed by means of cells and bloodvessels from the young connective tissue which encapsulates them; and that this same process of external absorption occurs hand in hand with the internal absorption in fragments whose cells are transplanted alive.

It will be seen by reference to the literature of this subject, which is already extensive, and upon which it is not the purpose of the writer to enter here, that these results do not reveal any special capacities in cartilage-cells which have not been already assumed by investigators of this theme; but as these studies have been heretofore largely confined to natural pathological changes, or, when experimental, have been usually incapable of such definite control and variation, the above series of experiments seem worthy of record, especially on account of the greater certainty which they impart to the assumption of the capacity of cartilage-cells under changed conditions, to participate directly in the formation of other forms of tissue. The bearing of this upon the question of the production of new cells in inflammation, after what was said at the commencement of this article, is sufficiently obvious without further remark.

Absorption pictures similar to some of those described above not only are frequently seen and have been repeatedly described and figured in some of the ordinary diseases of cartilage, but are common, and often extremely puzzling, in certain of the complex tumours of the parotid and submaxillary glands.

ARTICLE V.

OPENING AND DRAINAGE OF CAVITIES IN THE LUNGS.¹ By CHRISTIAN FENGER, M.D., and J. H. HOLLISTER, M.D., of Chicago, Illinois.

It is only a little more than a decade since Professor Mosler, of Greifswald in Germany, conceived the brilliant idea of combating cavities in the interior of the lung by surgical means. It was natural that the consumptive cavity, being the most common in the lungs, and the variety which offered the most desperate resistance to medical treatment, should be the first selected for a trial, for the following reasons:—

I. The superficial wall of such cavities was known to be adherent, in most cases, to the wall of the chest; consequently the cavity could be

¹ Read before the Minnesota State Medical Society, June 20, 1881.

opened without much danger of opening the pleural cavity, and thereby causing a fatal pyo-pneumothorax.

II. It was believed by a large part of the profession that infection of the still healthy lung-tissue was caused by aspiration of the liquefied cheesy matter contained in the consumptive cavities, and this, when brought in contact with still healthy bronchial tubes, would cause endo-bronchitis and peri-bronchitis, which were shown by Virchow to be among the most common features in the consumptive destruction of lung-tissue.

Mosler opened and drained a superficial consumptive cavity, using a silver drainage-tube. The result, however, did not fulfil the expectations. The patient died in due time from the pulmonary consumption, which had progressed notwithstanding the operation. As a consequence of this, the surgical treatment of consumptive cavities was abandoned, to remain in the history of medical science only as an interesting experiment.

But although Mosler's operation was of no avail in the treatment of pulmonary consumption, it accomplished this much good, that it called the attention of the profession to the surgical treatment of cavities in the lungs, and demonstrated that such cavities might be opened and drained without any of the dangers or inconveniences which, from *à priori* reasoning regarding a hitherto untried surgical procedure, might be expected to arise.

The next step in the surgery of the lungs was to attack less malignantly destructive pathological processes, which, as we know from observation of like processes in other tissues of the body, may terminate in recovery. These processes include suppuration and gangrene of lung-tissue, in other words, abscesses and pulmonary gangrene.

Cavities arising from acute pathological processes in the lung-tissue, naturally present themselves as objects for surgical treatment, when the anatomical conditions, that is, the position of the cavity, make such treatment possible, for the following reasons :—

There is, in the nature of these two pathological processes, nothing absolutely fatal, nothing necessarily progressive, as in tuberculosis, when this has developed so far as to form a large cavity. When the contents of a gangrenous or abscess cavity are entirely removed, there remains in the walls of the cavity no disease of the tissues which should necessarily prevent the closure of the cavity. This has been demonstrated by a number of cases of this kind, in which spontaneous recovery has taken place by evacuation of the contents of the cavity through the bronchial tubes.

But in spite of the possibility of spontaneous recovery, which in pulmonary gangrene rarely occurs, but is somewhat more common in abscesses, a number of cases remain, in which the size and progressive enlargement of the cavity and the gradual failing of the patient's strength, enable us to determine, a considerable time before death, that a fatal result is inevi-

table, and it is in such cases that we are tempted and have the right to claim assistance by means of surgical interference, for the following reason :—

The decomposing contents of such cavities, whether gangrenous fluid or ichorous pus, causes the progressive destruction of the lung-tissue *in loco*, namely, the increase in size of the cavities, as well as the general poisoning of the organism by absorption, with rise in temperature and decrease in strength. Besides this, the poisonous contents of the cavities are apt at any time, by aspiration through the bronchial tubes, to give rise to purulent bronchitis, broncho-pneumonia, or pleurisy in distant parts of the lungs. Any of these complications may at any time cause a sudden fatal termination before the time at which the gangrene or pulmonary abscess would come to its natural termination by exhaustion.

From the above considerations we are justified in desiring and attempting to evacuate the contents of such cavities, and in so doing, to expect not only to arrest the progress of the disease and avoid the complications from distant parts of the lungs, but also to cause the closure of the cavities so as to effect a definite cure.

The number of cases of acute cavities in the lungs in which surgical interference has been resorted to is as yet very limited, only six cases having been reported, and these within the last three years. Of these six cases only one, our own case, was successful, in so far that it terminated in a complete recovery.

But even from some of the cases that terminated fatally it was seen that immediate relief and temporary improvement in the patient's condition followed the operation to such an extent that the attention of the medical profession was drawn to the subject, and justifiable encouragement was given to further trials.

The importance of the subject warrants the report in detail of the cases, which we shall give as minutely as we are able, and, having done this, we shall discuss as far as possible the most important aspects of the question.

The first two cases, on account of the imperfect reports, but with the diagnosis confirmed by the autopsy, only show that the surgical evacuation of the contents of the cavities gave considerable relief to the patients, and in the second case this relief lasted so long that recovery was fully expected.

CASE I. *Large Abscess of the Lower Lobe of the Right Lung.—Incision in the mammary region—Washing out of the cavity—Immediate relief—Acute pleurisy on the opposite side—Death twenty-nine hours after the operation.* (Radek, 1878, *Centralblatt für Chirurgie*, No. 44, 1878, p. 750.)—A man, forty-four years of age, was brought into the hospital suffering from great dyspnoea. Examination showed two large fluctuating abscesses in the neighbourhood of the right nipple. Pressure over the abscess-cavities showed that they communicated with each other, and caused increased dyspnoea and cough, which brought up a quantity of pus. The diagnosis was supposed to be an empyema which was about to open through the walls of the chest, and had already broken into the lung.

An incision was made, through which about a quart of pus was evacuated. The cavity was washed out with carbolized water, and the patient experienced immediate relief. On the following day, however, twelve hours after the operation, the fever set in anew, and the physical examination showed that a pleurisy was commencing in the left lung. The patient died twenty-nine hours after the operation. The autopsy showed no empyema, but a very large abscess of the lower lobe of the right lung and a recent pleurisy on the left side.

This case came under treatment at so late a stage of the disease that it has no value as regards diagnosis and the method of operation. It shows, however, that the operation was followed by some relief, and did not in any way hasten the fatal termination, but was performed too late to prevent it.

CASE II. Large Abscess in Lower Lobe of Left Lung.—*Fetid expectoration—Insufficient drainage through the bronchial tubes—Incision in sixth intercostal space—Drainage and washing out with carbolized water—Marked improvement for twenty-six days—Sudden and unexpected death on the thirty-first day—Cause of death not given.* (R. S. Sutton, Pittsburgh, Pa., 1879, *Chicago Medical Review*, March 5, 1881, p. 112.)—Early in 1879 I was called to see a Bavarian, aged thirty-four, who was much emaciated, but presented the appearance of having been a very powerful man. The patient had a hoarse voice and a rapid pulse, his temperature on further examination being found slightly above the normal. He had had, five years before, a violent attack of pneumonia, from which he had never entirely recovered, but, although for a time somewhat better than during the pneumonia, his general health had become much worse than it had been prior to the attack. Two years subsequent to the pneumonia he had three attacks of hæmoptysis, a year after which, symptoms of acute pleurisy made their appearance on the left side. At the present time the patient has much cough and a muco-purulent expectoration. On physical examination the right lung is apparently normal. There is a total absence of vesicular respiration on the left side, gurgling, increased on coughing, being present at the same time; there is complete dullness on percussion while the patient remains sitting. On the patient's assuming a recumbent posture, succussion showed a decided metallic tinkling. The recumbent position provoked cough, with increased expectoration, having a foul odour. The patient was informed that his case was one of doubtful prognosis, and thereupon left further procedure to the physician. The day following the examination just mentioned I visited the patient in company with Dr. Geo. Rohansen, fully prepared to operate. To determine the correctness of the diagnosis of the supposed cavity, the lung was aspirated, giving vent to quite a quantity of ill-odoured pus. A bistoury was plunged into the lung at the sixth intercostal space, giving vent to quite a quantity of foul, purulent material, which was ejected with some force when the patient coughed. Two large-sized Nélaton's catheters were passed into the cavity through the opening and secured by adhesive plaster, at the margins of the wound; carbolized distilled water at a temperature of 100° F. was projected, by means of a Davidson's syringe, through one of the catheters, passing out through the other. The patient experienced the odour of carbolic acid at its first injection. The cavity was washed out daily for a month, the patient being well fed. He was able to be up and about for twenty-six days, and was apparently on a fair road to recovery, when he died suddenly on the thirty-first day. At the autopsy an abscess was found involving the entire lower lobe of the left lung. The pleura pneumonalis and costalis were glued together. An enlarged bronchial tube led from the abscess to the trachea.

This case, although so superficially reported that it does not furnish any tangible points for the differential diagnosis between empyema and pulmonary abscess, has considerably more interest than Radek's case, because it shows—the diagnosis being confirmed by the autopsy—that a large pulmonary abscess was opened, drained, and washed out, with

unmistakable relief, and that the effects were so beneficial that the patient seemed, for thirty days, to be in a fair way to recover. The autopsy, valuable as to the confirmation of the diagnosis of pulmonary abscess, failed to demonstrate the cause of the patient's death, and consequently the importance of the case is limited to the immediate consequences of the operation.

The following cases have considerably more interest, partly because the diagnosis was carefully made before the operation, and partly because the main feature in the indications in all these cases was, by the operation, to evacuate fetid or gangrenous matter from pulmonary cavities having insufficient outlets through the bronchial tubes, and where consequently the remaining fetid matter produced symptoms of general poisoning by absorption, as fever, collapse, etc., as well as poisoning of the rest of the lungs, in the shape of diffuse fetid bronchitis. In all of these cases except one, the operation was followed by decided relief, temporary in two cases, and permanent in our own.

CASE III. Multiple Fetid Abscesses in lower Lobe of Right Lung, subsequent to Bronchitis and Pleuro-pneumonia.—Hectic diarrhœa—Insufficient outlet through the bronchi—Incision in eighth intercostal space, mid-scapular line—Drainage and washing out with Condyl's fluid—Temporary cessation of cough and fetor for three weeks—Insufficient drainage—Return of fetor—Pleuro-pneumonia on the opposite side—Death fifty days after the operation. (W. Douglas Powell and R. W. Lyall, London, England, 1879; *Lancet*, vol. ii. No. 1, 1880, p. 12.)—A man, forty-nine years of age, had bronchitis in December, 1878, and in February, 1879, a pleuro-pneumonia and fetid expectoration. He improved for a time, but then suffered a relapse. In July, 1879, he entered Middlesex Hospital. On admission there was consolidation of the lower lobe of the right lung, with excavation of its central portion, the cavity signs being located at about the level of the spine of the seventh dorsal vertebra, and in line with the angle of the scapula. There were considerable hectic, diarrhœa, and anorexia. The breath and expectoration were extremely fetid, the latter being muco-purulent in character and very abundant, amounting to about one pint in twenty-four hours.

The area of excavation having been carefully marked out, the operation was performed September 11th. A medium-sized trocar was first passed in at the eighth intercostal space, mid-scapular line, and, a free incision having been made through the tissues down to the intercostal muscles, the fine trocar was withdrawn and a full-sized hydrocele trocar inserted to enlarge the opening, through which the drainage-tube was afterwards inserted. Carbolyzed dressings were then applied. A moderate quantity of fetid pus escaped from the wound, and subsequently a free but never abundant discharge from the drainage-tube.

The expectoration and cough almost entirely ceased. The wound was dressed daily under the carbolic spray, and injections of Condyl's permanganate of potash solution were used. October 2d. There was some return of the fetor of breath, the discharge from the tube having always been somewhat fetid. Some trouble was occasioned by the drainage-tube getting out, its re-introduction being rendered more difficult by encroaching granulations, and the tube was felt to strike against some impediment deep in the lung. The channel was kept dilated, however, and the patient improved in strength, and on October 20th, was transferred to Brompton Hospital. The fetid sputa returned toward the end of the month, however; the amount expectorated also continued to be very scanty. The patient lost ground rapidly, and was finally attacked by pleuro-pneumonia on the opposite side, from which he died October 31st, fifty days after the operation.

The autopsy demonstrated several inter-communicating cavities in the lower lobe of the right lung. This lobe was firmly adherent throughout, and a drainage-

tube passing through the eighth intercostal space entered the contracted cavity, which was connected with the main cavity by a short, dilated bronchus. It was evident that, in contracting upon the tube, the wall of the cavity partially occluded its extremity. The remainder of the lobe was consolidated by fibroid interstitial pneumonia, surrounding bronchiectatic cavities. There was broncho-pneumonia with effusion on the left side. The rest of the lung was emphysematous.

Besides the very remarkable relief derived from the operation, this case is mainly interesting because it shows that the insufficient drainage and evacuation was evidently the reason why the latter failed to save the patient's life. And it was here, as in Radek's case, the poisoning of the other lung from the decomposed contents of the cavity which, resulting in a pleuro-pneumonia, caused the patient's death. In short, we may say that the patient died notwithstanding the operation, on account of the perhaps inevitable insufficiency of the operation, but by no means from any reason for which the operation itself could be held accountable.

A similar condition probably existed in Williams's case, which is mentioned only very briefly, too briefly to allow either deductions or criticisms, but which, for the sake of completeness, we shall mention.

CASE IV. (Williams, London, England, 1879, *Lancet*, vol. ii. No. 1, 1880, p. 12.)—Dr. Williams briefly mentions that in one case he passed an aspirator needle into a bronchiectatic cavity without result. On a second tapping, however, he succeeded in evacuating the contents of a limited empyema, which, he thinks, may have been caused by the previous paracentesis.

It is easily seen that in Williams's case it is difficult to determine whether the entire want of success of the operation was due to avoidable inefficiency in the method of operating or to the unavoidable surgical intractability of bronchiectatic cavities in general. Such cavities, on account of their well-known irregularly sacculated and often ramified shape, present very great, if not insurmountable difficulties for effective surgical interference.

The following case is very interesting, because it presents, notwithstanding the want of an autopsy, a clear case of acute pulmonary gangrene subsequent to a croupous pneumonia. The description of the case, as well from the etiology as from the careful description of the development and physical signs, leaves no doubt as to the correctness of the diagnosis. It is probably the first, if not the only case of pulmonary gangrene treated by surgical operation, which, as far as temporary relief is concerned, may be accounted a success.

CASE V. *Gangrenous Cavity in Middle Lobe of Right Lung subsequent to Croupous Pneumonia.*—*Insufficient outlet through the bronchi—Adynamic condition of patient—Incision in the region of the angle of the scapula—Drainage with injections of carbolized water—Decided improvement for a week—Cessation of fetor of breath and expectoration—Return of fetid expectoration—Collapse and death twelve days after the operation.* (Solomon Charles Smith, Halifax, England, 1879, *Lancet*, vol. ii. No. 3, 1880, p. 86.)—The patient, a man about sixty years of age, had always been in good health, until two months previous to the operation, during which time he had had a little shortness of breath on going up hill. Two weeks previous to the operation he had a sudden attack of pneumonia of the right side, with chills, pain in the right side, pneumonic crepi-

tus and rusty sputum. The case was not very severe, the temperature never exceeding 102° , and in about a week he got up. Two days later, the cough became worse, he felt weak, had to go to bed, and his breath had an offensive odour.

October 13, he suddenly expectorated half a pint of fetid gray fluid, and sank rapidly into a condition of collapse. On the next day, the patient was covered with clammy perspiration, his respiration was rapid and difficult, with loud tracheal râles; pulse 130, very feeble; could not lie down on account of the cough. The air of the whole room was extremely offensive on account of the gangrenous odour of breath and expectoration. The matter expectorated was principally a thick, tenacious, mucopurulent mass, but frequently alternating with this, was a thin, gray, offensive fluid, which seemed to gush into his throat suddenly, in such quantity that he would spit out mouthful after mouthful of about half an ounce each, for three or four times in succession. The right side was slightly less resonant than the left, especially at the base, and at and under the right nipple. There was less respiratory sound on the right side and less local vibration, but all the sounds were greatly masked by tracheal râles; he had no pain; the tongue was brownish-black and dry, and the patient was very weak. Under invigorating and stimulating treatment he seemed to improve a little for a day or two, but then the expectoration diminished and he became worse. Four days later, a quantity of the same fetid fluid as before was expectorated, and he felt a little relieved, but soon afterward the expectoration stopped again and the adynamic condition of the patient increased.

On October 20, distinct cavernous respiration was heard below the spine of the right scapula, and external to and below the right nipple. The diagnosis was now made of a large cavity extending chiefly through the middle lobe of the right lung, with no efficient outlet for the contained fetid matter, and a consequent adynamic condition of the patient from poisoning by the fetid pus. It was now resolved to operate, with a view toward procuring an outlet for the fetid matter, for the following reasons:—

I. That the actual condition of the patient made it certain that he would die, and that very speedily.

II. That there would be some chance for his life if the cavity could be found and an opening made.

III. That it would be justifiable to explore with an aspirator, and if the cavity was found, to enlarge the opening and put in a drainage-tube.

At a point near the angle of the scapula, an aspirator-needle was inserted for three or four inches. No fluid escaped, but very fetid air was drawn through the tube. On holding a candle near the canula, the flame was blown to and fro during respiration, so that evidently a cavity had been reached.

Using the canula as a director, a knife was inserted between the ribs, and by the side of the knife dressing forceps were slipped in and the wound enlarged sufficiently to allow the introduction of a small india-rubber tube. Through the latter, a little carbolic acid solution was injected. This seemed to occasion a fit of coughing, when about half a pint of fetid pus, of the same character as the former offensive expectoration, was forcibly expectorated. The tube was left in the wound, which was covered by a large pad of a dozen folds of coarse muslin, wrung out of a solution of carbolic acid. This dressing was ordered to be changed every three hours.

For the first week after the operation, the improvement was very decided. For six days, the expectoration was very much diminished. The fetor also became much less, except at the time when the dressing was changed. He enjoyed his food more, and was altogether more comfortable. The respiration became much clearer in the left lung and the unaffected parts of the right lung, the moist sounds being much less frequent, and the tracheal râles only occasional. The discharge from the wound, however, continued extremely offensive, notwithstanding the daily irrigation of the cavity by a siphon. Whenever the dressing was changed, it was found to be soaked with a discharge for an area of five to six inches in diameter. As the water which escaped on washing out the cavity was only slightly stained, the offensiveness was attributed not to any retention of pus, but rather to sloughing within the lung.

Eight days after the operation the discharge had lessened a good deal, but the

expectoration now increased and again became offensive. The pulse increased to 112; temperature, 100°. On the next day he was better, in the morning, had less cough and expectoration, and took food well. But the wound was beginning to slough, and a few gangrenous black shreds were discharged through the drainage-tube. In the afternoon he became very ill, with laboured breathing, quick pulse, and profuse cold sweats. From this time he gradually became weaker, would take no more food, and died November 2, apparently from simple asthenia. An autopsy was not held.

Isolated as this case stands as an effort to evacuate the contents of an indisputably gangrenous lung cavity, it may be hazardous to venture any justifiable criticism upon the operation in the case in question, from which to deduce any conclusions showing that in such a case the patient's life might have been saved. But it is barely possible that, if an opening had also been made in the anterior wall of the cavity when the cavernous breathing presented itself round the nipple, that then more efficient and perhaps sufficient drainage, and an outlet for all the gangrenous matter, fluid as well as solid, might have been effected.

That a double, free, and extensive opening of similar pulmonary cavities, with thoroughly effective drainage, by no means involves any additional danger, but rather, when practicable, is liable to make it possible to save the patient's life, we claim to show by the following case.

CASE VI. Large Fetid Abscess Cavity in Middle Lobe of Right Lung, caused by Suppuration around a Large Echinococcus Cyst, of twelve years' standing.—Fetor of breath and expectoration—Insufficient outlet through the bronchi—Diffuse purulent bronchitis in the rest of the right lung—Fever, emaciation, and collapse—Exploratory aspiration—Incision in third intercostal space on anterior surface, two inches to right of sternum—Digital exploration of the cavity—Counter opening in fifth intercostal space, anterior axillary line—Removal of the sac of the echinococcus cyst through the anterior opening—Drainage, by means of a large rubber tube—Washing out of the cavity with carbolic acid solution—Antiseptic dressing—Definite cessation of fetor of breath and expectoration—Wound closed in six weeks—In the seventh week, broncho-pneumonia of right lung, with diffuse purulent bronchitis of this and of the lower lobe of left lung, lasting four weeks—Perfect recovery. (Christian Fenger, Chicago, 1880. *Chicago Medical Review*, vol. iii. No. 3, 1881, p. 57).—Francesco Coputo, Italian, a labourer, 34 years of age, was admitted to Cook County Hospital and placed under Dr. Hollister's care.

Previous History.—Father died at the age of 77; mother still living. He has one brother and one sister, who are in good health. He had always had good health until twelve years ago, at which time he was a mounted gendarme in Italy, and on duty from three to four hours consecutively. He had at this time a hemorrhage from the lungs of about two ounces, in consequence of which he was obliged to remain in the hospital a week. For the following two years he was well. After this time, he had a cough accompanied by pain around the right nipple. The pain subsided on the application of leeches; the cough also disappeared entirely after a month. In the following years he had every autumn a return of the pain, always at the same point in the chest, between the third and fifth ribs, and around the nipple, accompanied by cough. This would

persist for about a month, be relieved by the use of leeches and venesection, and disappear entirely. During the last four years, however, the pain became more severe, as did also the accompanying cough. In the intervals between the attacks, he would occasionally feel some pain in the region of the right nipple, when lifting a heavy weight on the right shoulder.

He came to New York in 1878, where he stayed a year and a half. He was able to work all this time, except during the usual attacks of the pain and cough in the fall, during which he expectorated mucous matter, which occasionally was slightly streaked with blood. In June, 1880, he came to Chicago and commenced work as a common labourer. In September the pain in the left nipple set in again. It was a steady, unvarying, intense pain, accompanied by only a slight cough. His appetite remained good, and he did not go to bed, but was forced to cease work for two weeks. During October he was at work again. In November, he was obliged to stop work on account of a return of the pain and cough. He lost his appetite, became weak, was confined to his bed about half the time, and finally, three weeks before he entered the hospital, he was obliged to remain in bed all the time. During this time he had no appetite, was feverish, would cough up about a pint of mucous matter, sometimes streaked with blood, in twenty-four hours, and was distressed night and day by the cough, which he could subdue only by lying prone in bed. A cataplasm was applied to the chest, and some medicine given. Suddenly, about a week before his admission to the hospital, he coughed up a large quantity of whitish matter, as he says, "white like paper." This was not followed by relief of the pain or cough, which rather increased. He grew more and more weak, could not eat, was not able to sleep on account of the cough and pain, and was told by those about him that his breath was offensive, he himself not being able to detect this.

On Admission.—The patient was in a profuse perspiration; pulse 98; temperature 104° ; respiration 36; tongue slightly coated. When he lies on the back, and the chest is percussed, he coughs incessantly, and a very offensive odour is noticed around the bed. When he lies prone on the right side, the cough ceases, and the offensive odour is not so marked.

Examination.—The patient is poorly nourished, tall, and of moderate weight.

Percussion.—When the patient is sitting up in bed, percussion on the right side, over the supra-clavicular and infra-clavicular regions is normal, but from the second rib, in the mammary and infra-mammary regions, the percussion is dull. There is also dull percussion in the axillary and infra-axillary regions, and over the scapular and inter-scapular regions. In the infra-scapular region, percussion is normal. When the patient lies on the back, there is an area of tympanitic percussion sound on the anterior side of the body, namely, in the mammary region.

Inspection.—Both sides of the chest participate equally in the respiratory movements. The right side of the chest is neither sunken nor prominent. The intercostal spaces have the same appearance on the right as on the left side.

Palpation.—In the region of the dull percussion, the pectoral fremitus is nearly but not quite absent.

Auscultation.—Over the right side of the chest. Sibilant râles in the upper lobe in the region of the clear percussion, and in the posterior part of the lower lobe. Over the regions of dull percussion, the respiratory

sounds are obscure. When the patient lies down, auscultation over the tympanic territories gives cavernous respiratory sounds.

A hypodermic needle was introduced near the right nipple by Dr. W. P. Verity, House Physician, while the patient was sitting up, and some fluid withdrawn, which was thin, grayish, and had the same offensive odour as the breath. On microscopical examination, this fluid was found to contain a large number of pus cells, with fatty detritus and bacteria.

Diagnosis.—Fetid cavity in the middle lobe of the right lung, nearer to the anterior surface, and most superficial at the nipple, having an insufficient outlet through a large bronchial tube in the anterior border of the cavity. Diffuse purulent bronchitis in the rest of the lung.

Five grains of quinia, every four hours, and whiskey sling were ordered.

December 22. The patient feels a little easier. When he is lying on the breast no offensive odour is perceptible. When he turns on the back, however, the breath becomes offensive, with an odour like rotten eggs, and cough sets in. In the morning the pulse was 84; temperature, 99°; respiration 32. Evening, pulse 90; temperature 102°; respiration 32.

For the next four days the patient remained in the same condition, having exacerbations of the fever at night, and lying prone on the right side in order to avoid the cough and offensive breathing.

26th. With the kind permission of Dr. Hollister, under whose care the patient was lying in the hospital, Dr. Fenger saw the patient and resolved to open and wash out the cavity. The reason for the operation was the following:—

As the large cavity in the anterior part of the lung had no sufficient outlet through the bronchial tubes, by which to evacuate its offensive contents, the poisonous character of which was indicated by the nightly exacerbations of fever and decrease in strength of the patient, it was deemed advisable to attempt to facilitate the evacuation.

Operation.—In the presence of Dr. Hollister, and assisted by the internes of the hospital, Dr. W. P. Verity, House Physician, and Drs. Guden, McArthur, Bradley, Meacher, Kendall, and Bacon, Dr. Fenger operated in the following manner: The patient was anæsthetized with ether. An incision was made, two and one-half inches in length, in the third intercostal space, parallel with the ribs, commencing one and one-half inches to the right of the sternum, and one and one-half inches above the nipple. The tissues were divided until the intercostal muscles were laid bare. A detached hypodermic needle was introduced, and as neither inspiration nor expiration caused this to move, it was withdrawn, and the incision continued into the cavity. When this was opened, about half a pint of grayish-white offensive matter, intermixed with some air, escaped. The opening was then dilated sufficiently to allow the introduction of a finger into the cavity. By means of the finger soft, elastic lung tissue was felt below the opening; above, the roof of the cavity could not be reached; soft, elastic lung tissue could also be felt on the interior wall of the cavity, towards the mediastinum, and in the posterior wall of the cavity. In this latter locality the soft, elastic lung tissue decreased in thickness toward the anterior boundary of the axillary region, anterior to which the wall of the cavity was firm to the touch. At this point, namely, between the fifth and sixth ribs, close to the border of the pectoralis major, one and one-half inches to the right of and one and one-half inches above the right nipple, a counter-opening was made in the following manner: A urethral sound

was passed in at the original opening, and cut down upon at the above-mentioned locality.

A heavy rubber draining-tube, ten millimetres in diameter, with large lateral openings, was now introduced at the anterior and brought out at the posterior opening. By means of an irrigator, a two and one-half per cent. solution of carbolic acid was injected through the drainage-tube into the cavity, which was washed out in this way. As soon as this solution filled up the cavity, the patient began to cough. Each paroxysm of coughing forced out from the anterior opening, at the side of the drainage-tube, a jet of fluid, which was thrown from eight to ten feet out into the room.

During these attacks of coughing it was noticed that a yellowish-white, coherent mass would appear at and protrude a little from the anterior opening, but would slip back and disappear as soon as the cough ceased. Dr. Fenger attempted to seize this with the forceps and draw it out, but it would break asunder and slip back. With a view to its removal, he now dilated the anterior opening a little, introduced a finger and the forceps, and watched for another attack of coughing, which enabled him to get hold of and draw it out as one large, gelatinous, coherent mass.

On microscopical examination of the gelatinous mass removed from the abscess cavity during the operation, it was found to be a large echinococcus cyst, the wall presenting the characteristic, finely striped, that is, laminated layers of amorphous or homogeneous substance, the stripes always running parallel to the surface of the wall of the cyst. The sac, as we here present it to the Society, will be seen to be nearly round, and between five and six inches in diameter. The wall was homogeneous, gelatinous, and transparent; soft and friable, but still somewhat elastic, and presented no secondary cysts, either attached to the wall or free in the cavity.

The cavity was now washed out with the carbolic acid solution until the escaping fluid was perfectly clear. The incision wounds were reduced in size by means of sutures, both ends of the drainage-tube were secured by large aseptized safety-pins, and cut off close to the skin, and the wounds dressed antiseptically, as follows:—

A piece of protective was placed over each wound, and a pad, two inches thick, consisting of antiseptic gauze, not in layers but in a wad, applied so as to cover the entire anterior, lateral, and posterior wall of the right side of the chest. The wad was kept in place by a layer of gauze, and covered with a thick layer of salicylated cotton, over which was placed a large piece of mackintosh. The whole of the dressing was held in place by a piece of cotton cloth, and fixed with roller bandages.

The patient was taken to his bed, and quinia, morphia, and whiskey given.

Dec. 27. Pulse 88; temp. 98°; the patient's breath has no offensive odour; he can lie on his back without coughing; has slept well; has coughed only a little; no bad odour to the sputum. The wound was dressed; the dressings contained a little bloody pus; the cavity was washed out with one per cent. solution of carbolic acid, which made him cough, and forced a jet of fluid from the anterior opening through and beside the tube; the carbolic acid solution passed up into the mouth so that the patient could taste it.

28th. Pulse 80; temp. 98.5°. Less pus in the dressings. There is no noticeable offensive odour.

29th. Pulse 90; temp. 98.5°. The patient begins to have an appetite, sleeps well, and has very little cough.

The dressings were removed every day. The solution with which the cavity was washed out contained less and less pus.

Jan. 9, 1881. Pulse 108; temp. 98.5°. The water with which the cavity was washed out still has a whitish colour.

17th. When water is injected into the cavity, he coughs up part of it, and can taste and smell the carbolic acid.

21st. About two ounces of pus found in the discharge. If the patient coughs while an injection is being made, the fluid is ejected with great force through both ends of the drainage tube, from three to six feet in the air. As the cavity was evidently decreasing considerably in size, the axillary portion of the drainage-tube was removed in this way; the whole tube was taken out, cut in halves, and only one-half re-inserted through the anterior opening.

28th. No discharge in the dressings. The opening in the axillary region appears to have closed. The anterior opening is closing up fast around the drainage tube. Discontinued the injections into the cavity because it is quite small, and any injection causes great irritation of the bronchi, resulting in paroxysms of coughing. The patient eats well, sleeps well, and his bowels are regular.

Feb. 3. The anterior wound is still open, but the opening is very small.

6th. Both wounds are closed. The patient has no cough; appetite good; sleeps well, and is out of bed.

9th. The patient caught cold while walking around the corridor yesterday. Has fever, headache, and cough, which caused him to go to bed. Pulse 92; temp. 101.5°. He has no pain in the chest. He has a cough, which is so distressing that it disturbs his sleep. Numerous moist râles are heard all over the right lung and in the lower lobe of the left lung. Ordered quinia, morphia, and the inhalation of carbolic acid spray.

14th. Pulse 96; temp. 99.5°. He coughs a good deal and expectorates about a pint of muco-purulent sputum in the twenty-four hours. His appetite is fairly good. Microscopical examination of the sputum shows pus-cells and epithelial cells in a more or less advanced state of fatty degeneration. No elastic lung fibres found. The sputum has no fetid odour. Ordered a respirator, to the anterior side of which is attached a sponge soaked in five per cent. solution of carbolic acid, to be used four or five hours a day.

17th. Pulse 102; temp. 99°. Says that the inhalation of the carbolic acid solution makes him vomit.

21st. The sputum is still abundant, and moist râles are heard over both lungs.

27th. Pulse 84; temp. 98.5°.

Physical Examination, Right Lung.—Over the right clavicular and supra-clavicular fossæ, there is dull percussion, and numerous fine crepitant râles are heard, both with inspiration and expiration. In the infra-clavicular, mammary, and infra-mammary regions, the percussion is normal, crepitant râles spread here and there, accompanying the otherwise normal respiratory sounds. In the supra-spinatus and infra-spinatus regions, the percussion sound is not exactly dull, but less sonorous than on the left side. In the infra-scapular region, percussion is normal. A few spread moist râles are heard all over the posterior surface of the lung. The respiratory sounds are otherwise normal.

Left Lung.—The anterior surface is in every respect normal. On the posterior surface, the upper half of the lung is normal, but in the infra-

scapular region, numerous fine crepitant râles are heard, both with expiration and inspiration.

Ordered Griffith's mixture, syrup of morphia, and cod-liver oil, and the continuance of the inhalation of carbolic acid spray from the sponge and by the atomizer. The patient expectorates in twenty-four hours about half a pint of colourless matter, consisting of semi-transparent slimy matter, intermixed with yellow lumps.

March 4. Pulse 72; temp. 98.5°. The dulness in the upper lobe of the right lung is subsiding, so that now the inner half of the right clavicular region gives clear percussion. There is still dull percussion, however, over the outer half of the right clavicular and supra-clavicular regions. The crepitant râles have diminished considerably over the apex of this lung, and have disappeared in the rest of the lung, except at a point corresponding to the lower half of the former cavity; namely, a place in the anterior axillary line between the fourth and fifth ribs, to an extent of one to two square inches.

7th. Very little cough, and this brings up only slimy sputum, not to exceed one to two drachms in the course of twenty-four hours.

15th. Percussion is perfectly normal throughout both the right and left lung. Respiratory sounds are normal, movements of both sides of the chest normal. No atrophy or sinking-in over any part of the right lung. The patient has a very slight cough, with a little grayish-black mucous expectoration, probably from the pharynx or nasal cavity, the colour of the sputum being due to its admixture with dust. No râles in any place in the right lung. He sometimes feels slight pain in the above-described limited space in the right infra-axillary region. Pulse and temperature are normal. Appetite good. He has regained his strength, and looks well nourished and healthy.

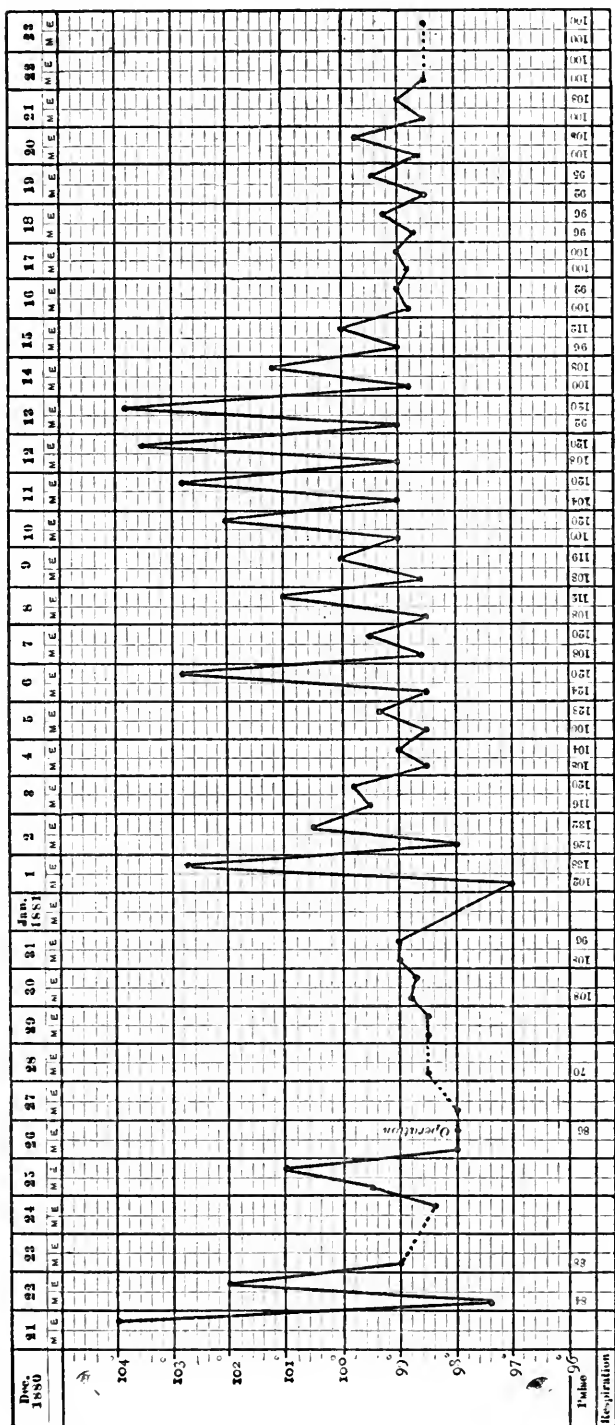
April 7th. The patient was discharged from the hospital, cured.

On the opposite page is a diagram showing the temperature curve of this case.

The first and main question that presents itself in this case is naturally this: Was the disease an ichorous cavity within the lung tissue, or was it a limited pyo-pneumothorax? As the patient did not die, and, as consequently we have no final proof, we must base the diagnosis upon the symptoms as given in the description of the case.

The symptoms, and the whole course of the disease were so exactly congruent with the description and course of echinococcus of the lung as given in *Ziemssen's Encyclopædia* (Parasites of the Lungs, vol. v, p. 462), that the diagnosis might have been made with a very great degree of probability, even before the evacuation and microscopical examination of the cyst. The pulmonary hemorrhage, pain in the affected lung, recurrent attacks of cough, that is, bronchitis, persistent pain, always at the same place, and increased by bodily exertion, all these symptoms increasing slowly during a long series of years, and, finally, the death of the echinococcus and suppuration in and around the sac, form, taken together, the typical course of a large pulmonary echinococcus. But we know that in very rare cases an echinococcus may develop within the pleural cavity.

The alternating dull and tympanitic percussion, according to the dis-



placement of the contents of the cavity, is, as is well known, exactly the same in extra-pulmonary as in superficial intra-pulmonary cavities. The position of the cavity, at the anterior half of the middle lobe of the lung, is unusual for empyemas, but, nevertheless, does not exclude the possibility of their presence. The pathological character of the cavity, as a separate echinococcus sac, would favour rather intra-pulmonary than extra-pulmonary location, not only because the embryo echinococcus, in terminating its wanderings from the intestines to its final resting place, is obliged, so to speak, to stop and select this somewhere in the solid tissues of one or another organ, rather than to enter a serous cavity like the pleura, but also because we know that the tissue of the lung is, with the exception of the liver, the most common location for echinococci.

This, however, did not exclude the possibility of our having a pleural echinococcus, and, consequently, an extra-pulmonary cavity to deal with, since there are a few indisputable cases on record, in which echinococci have been found in serous cavities without any visible primary connection with, or development from, the organs belonging to the cavity.

Cobbold describes in his book (*Parasites, or the Entozoa of Men and Animals*, London, 1879, p. 133), a case in which an echinococcus sac was found between the liver and diaphragm, having no apparent connection with any of the organs. Cases of similar echinococci in the pleural cavity are also on record, but these are very rare.

The only physical sign which, in the opinion of the authors, enables us to make a differential diagnosis between an extra-pleural and an intra-pleural cavity, communicating with the bronchi, and filled partly with fluid and partly with air, is the pectoral fremitus. We formerly believed that on the wall of the chest over an extra-pulmonary cavity, we should find the pectoral fremitus absent, and that on the wall of the chest over an intra-pulmonary cavity, we should find it increased in intensity. This doctrine is undoubtedly correct as far as consumptive cavities are concerned, but it seems to be open to doubt whether it is the same in cases of abscess or gangrenous cavities, as in Smith's and in our own case the pectoral fremitus over the cavities was lessened, but not absent. In Simpson's description of the symptoms of echinococcus, he states that the vocal fremitus is diminished.

The cavernous breathing and tympanitic percussion sounds are common to both extra-pulmonary and intra-pulmonary cavities, and even the sudden and violent ejection of the contents of the cavity through the wound of operation, may occur in an extra-pulmonary cavity, when the communication with the lung tissue and bronchial tubes is sufficiently large to admit of the free passage of air from the bronchi, during expiration and cough.

As it is sometimes so difficult to make a differential diagnosis by the

physical signs alone, this task may be rendered more easy by taking into consideration the whole development and course of the disease.

In a case like Smith's, for instance, where subsequent to an attack of croupous pneumonia, the resolution of the peripheral area of which has taken place, and then gangrene set in, in a part of the lung over which the percussion is clear, and in which the breathing has gradually become cavernous, the diagnosis presents, of course, no peculiar difficulties. In other cases, as our own, for example, the differential diagnosis may be difficult, if not impossible up to the time of the operation, during which it is possible that the examination of the cavity with the finger, that is, the palpation of its walls, may enable us to ascertain the nature of the cavity. In our own case, any doubt which might have existed as to the intra-pulmonary character of the cavity was dispelled by the examination with the finger, which showed that soft lung tissue formed the lower, inner, and outer wall of the cavity. If the echinococcus had been developed in the anterior part of the pleural cavity, it would have pushed the anterior border of the lung, together with the lung itself, backward, and no lung tissue would have been found on the interior wall of the cavity.

A number of very important questions naturally present themselves whenever a new and somewhat radical treatment is entered upon in a class of diseases which have not been hitherto treated by direct surgical interference. The number of these questions still to be answered is so much the larger, as the cases, as yet on record, are comparatively few.

We shall endeavour to enumerate these questions, and point out the direction in which future investigations will have to be made, with a view of bringing them nearer to a solution. We shall therefore consider fully the following three points: The indications for the operation, the operation itself, and the after-treatment.

I. *Indications for the Operation.*—What cases of acute pulmonary cavities require or may be benefited by opening and drainage? In examining this question, we must consider not only the possibility of, but also the frequency with which acute cavities of the lungs, abscesses of course, rather than gangrenous cavities, have been known to terminate in spontaneous recovery. It will consequently never be advisable to operate at a very early stage of such a cavity, when the general condition of the patient may lead us to expect a spontaneous recovery by evacuation through the bronchi. On the other hand, to wait until the patient has been brought down to the very limits of vital power would be to press the expectant treatment too far. In Radek's case, the operation was evidently performed too late.

On reviewing the other cases on record, we think the operation is justifiable in any case where the presence of a gangrenous or ichorous cavity having been ascertained, it is found that, notwithstanding an outlet through the bronchi for a portion of the contents of the cavity, it steadily fills up

again; the partial evacuation does not relieve the patient, who gradually loses strength, and progresses toward a condition of collapse; a steady or intermittent rise in temperature continues; the infection of the healthy portions of the lung from the decomposed contents of the cavity has commenced, or is evidently about to take place; the breath and expectoration continue fetid; absence of appetite; increasing weakness, with or even without fever, etc. These indications will enable any medical man of some clinical experience to determine, in the majority of such cases, when the disease has reached a point from which spontaneous recovery is impossible.

Is the cavity so situated that we can get at it from the outside, and is the pleural cavity covering it obliterated by adhesions; so that we do not run any risk of causing a fetid pyo-pneumothorax by opening into the cavity and allowing decomposed matter to enter the pleural cavity? In answer to the first part of this question, we may say that any cavity covered by the scapula, or situated within the supra-clavicular and infra-clavicular regions may at present be regarded as inaccessible. But from the mammary and axillary regions downward, as well as in the infra-scapular region, the anatomical conditions of the wall of the chest do not prevent access to the cavity. Regarding the second part of the question, namely, the obliteration of the pleural cavity covering the field of operation: Such adhesions are to be expected in cases in which the superficial area of the cavity is large, or more frequently, in which several attacks of the disease have occurred in that portion of the lung where the cavity forms, constituting in all probability the primary cause of the gangrene or suppuration, both of which, as is well known, do not set in primarily, but are consecutive or secondary to a number of different primary pathological conditions of the lung tissue.

In many cases it will be impossible to ascertain whether or not these adhesions exist, and to be sure on this point, we shall recommend the procedure employed in our own case. Make an incision down to the intercostal muscles, pass a needle into the lung, and watch the needle during the phases of respiration. If it does not move synchronously with the respirations, we may be sure that at this place there are adhesions between the layers of the pleura, and may consequently cut in without fear. If the needle does move, we can abandon the operation if we choose, since the small primary incision, as well as the puncture with the needle or plastic pin, if covered by antiseptic dressing, will do the patient no harm.

A question yet to be determined is, whether the operation had better be abandoned when the needle moves and the pleural cavity is consequently known to exist. Smith makes a remark in regard to this point, with which we might theoretically feel inclined to agree; that the tapping of a progressive gangrenous cavity through a pleural cavity not yet obliterated, would appear only to hasten by a little what would inevitably soon occur of

itself, namely, the formation of a fetid pyo-pneumothorax. There is, however, the compensatory advantage that the incision which caused this empyema, is the most essential for its relief.

This is an open question, however, and the ground is very dangerous, as we know that such openings of still healthy pleural cavities have caused rather sudden and possibly inevitably fatal results.

As a last point in the indications for the operation, or rather as a preparatory measure, before the operation is resorted to, we should recommend that one or two exploratory aspirations be made with a hypodermic syringe, in the place in which the physical signs may lead us to locate the cavity about to be operated upon. This exploratory aspiration, when fetid matter is brought out from the cavity, not only furnishes us an unmistakable proof of the correctness of the diagnosis of a cavity filled with fetid matter, a mistake in the diagnosis of which would prove a very disagreeable surprise during the progress of the operation, but it may also give us some idea as to the situation of the cavity beneath the surface.

II. *The Operation.*—The operation having been decided upon, the first question is: Where shall the opening through the wall of the chest be made? or rather: At what point shall we cut in? In cases in which the cavernous symptoms are limited to a single small spot of the thorax, the place of incision shows itself easily enough, as the choice of necessity. But cases may occur, like Smith's, for instance, where the cavity comes to the surface at different or distant places. It has been suggested that in such cases, the general rules for the opening of abscesses should be followed out, namely, that the lowest point, the point nearest to the bottom of the cavity, should be selected as the place most favourable for the escape of its contents through the drainage tubes.

As the local and general condition of the patient to be operated upon will not enable him to be out of bed, and as the recumbent position will consequently be necessary, it would seem desirable to select a place for the incision as near the posterior and inferior surface of the cavity as possible. The posterior wall of the thorax has, however, this disadvantage, that the intercostal spaces here are narrower than on the anterior wall of the thorax, and that, consequently, not only the introduction of a sufficiently large tube may be difficult, but the introduction of the finger for exploring the cavity may be entirely impossible, unless resection of a portion of one of the ribs is resorted to. That the latter procedure is not very dangerous in itself we know from operations for empyema, and in case of necessity we shall not hesitate to resort to it. But the excision of a piece of a rib may cause suppurative periostitis and necrosis, and should consequently be avoided when not absolutely necessary.

The most natural way of solving the problem of the place for opening pulmonary cavities seems to us to be the following: Be guided as far as possible by the common law for the opening and evacuation of abscesses

in any other part of the body, that is, make two openings; the first or primary opening in the most superficial and in other respects most easily accessible place to the cavity, then explore the cavity, and by this exploration try to ascertain the deepest point which will allow of a counter-opening being made in the most favourable and safe place, for, as nearly as possible, the complete evacuation of the contents of the cavity.

In our own case this plan proved eminently satisfactory, and the existence of two openings instead of one was not only not accompanied by the slightest disadvantage in any way, but, in our opinion, facilitated greatly the evacuation and cleansing of the cavity.

When there is only one opening into a cavity, the evacuation may be perfect; but thorough washing out, even through a double catheter or tube is, for reasons too obvious to mention, not as efficient as when two openings have been made.

Washing out through a single tube, as has been done in most of the previous cases, causes, from distension of the walls of the cavity and irritation of the bronchial tubes by the fluid injected, so much irritation and so violent a cough, that Mosler, Williams, and Lyell were obliged to abandon the injections as too irritating to the patient.

When these authors go a step farther, and say that injections into the cavity are not all necessary, because the symptoms are relieved and the fetor is stopped by the simple drainage of the cavity, we must say that the facts from the cases recorded do not quite corroborate this assertion, as neither in Smith's nor in Powell and Lyell's case was the fetid condition of the contents of the cavity entirely overcome by the operation alone.

Taking into consideration the fact that in all cases previous to our own, only one opening had been made, and only a single drainage-tube employed, it is very probable that to the drainage and cleansing of the cavity by means of the double opening in our own case, is to be attributed the instant and permanently perfect result as regards the disappearance of the fetor.

Having thus decided where to cut down upon the cavity, we make an incision, one to two inches in length, in the middle of the intercostal space, parallel to the ribs, down to the intercostal muscles or pleura, ligating any vessels met with. A somewhat free incision is liable to prevent general subcutaneous emphysema from setting in. This does not seem to be very dangerous, however, as in Williams's case, in which the air contained was fetid, no inflammation occurred and the emphysema disappeared.

The next point is how to make the opening through the pleura or rather the lung tissue which possibly forms the peripheral wall of the cavity. We must remember that the lung tissue of the wall of the cavity, which we have to cut through, may contain arterial or venous pulmonary branches, sufficient in size to cause a considerable and very undesirable

hemorrhage, which in this place, it might be difficult if not impossible to control. We therefore agree with Lyell and Smith that it is not desirable to make too free use of the knife here, or, as Sutton describes it, to "plunge" a knife into the cavity. A punctured opening should rather be made with a medium sized trocar, and this opening dilated by blunt instruments as, for instance, a dressing forceps, sufficient to admit either, as the above author states, a sufficiently large drainage tube, or rather, as we should not hesitate to propose in any case, to admit a finger for the exploration of the cavity.

The exploration of the cavity with the finger serves a double purpose: First, to find a suitable place, at the lowest possible part of the cavity, at which a counter-opening may be made safely, that is, without cutting through too much lung tissue or into the pleural cavity; and, second, to ascertain by touch, the presence of free sequestered pieces of dead lung tissue, with a view to their removal. This latter is mainly of importance in gangrenous cavities. In circumscribed gangrene of the lungs, a piece of dead lung tissue of the size of a walnut may be found (Rokitansky, *Pathological Anatomy*, Sydenham Soc.'s Edition, vol. iv. p. 96). The removal of this is of course essential to the stoppage of the fetor and of the possible infection of the rest of the lung.

That such a piece of gangrenous lung tissue can be successfully removed, and the patient recover, has been demonstrated in a case of gangrenous pleurisy, reported by Wagner (*Berliner Klinische Wochenschrift*, Sept. 6, 1880, p. 511), in which by an opening through the empyema, a piece of gangrenous lung tissue, seven centimetres long and three centimetres broad, was removed, after which the fetor immediately stopped, and the patient finally recovered.

The next important point to consider is with what kind of drainage-tube the most efficient drainage of the cavity may be accomplished. Mosler used a silver tube. In all the other cases, rubber tubes have been used, but Lyell advocates the silver tube with a shield with which to strap it to the chest, in the same way as the canula for tracheotomy. In our opinion, metal, hard rubber, or any tubes of hard material are dangerous, because there will always be a possibility of hemorrhage into the cavity, caused by ulceration of a vessel in the wall of the cavity from rubbing against the hard tube.

That ulceration and fatal hemorrhage may take place in this way we know from cases of fatal hemorrhage caused by usura of vessels from rubbing against calcareous deposits, the so-called "lung stones," in small pulmonary bronchiectatic cavities, which were healing, but in which, for some reason, the irregularly shaped lung stones were not evacuated through the bronchi, but remained in the cavity. Consequently we prefer soft material, as flexible India-rubber, for drainage tubes for use in lung cavities.

In cases in which it is impossible to make more than one opening into

the pulmonary cavity, we recommend the use of a double, soft rubber, drainage-tube, which is easily made by cutting the necessary openings in the walls of the tube, and bending it in the middle, so that one hole shall be at the bottom of the tube when bent, and several openings on either side of the double tube. This may then be sewed together, and the tube is ready for insertion.

In the cases previously referred to, in which only one opening was made, a single tube was always used, and the drainage was insufficient, because the fetor was not permanently overcome, and the washing out was very irritating, for the reasons stated above.

When two openings can be made into the cavity, we advise that the method employed in our own case be followed out, namely, to introduce a large, soft rubber drainage-tube through one opening and lead it out at the other. To prevent these drainage tubes from slipping in or out of the cavity, we recommend the use of a disinfected safety pin passed through the peripheral ends of the tube. If thought necessary, this pin may be easily secured by straps around the chest, and the tube cut off just beyond the pin.

The washing out of the cavity can be effected without much irritation to the patient, by means of a double drainage tube when there is only one opening or of a single perforated tube when there are two openings, provided the fluid is not injected too vigorously.

The thorough washing out of the cavity is important as long as any fetor remains. With what solution this should be accomplished is an open question. Lyell used Condy's fluid; Smith, a solution of carbolic acid of unknown strength, and in our own case, we used for the first irrigation a two and one-half per cent. solution of carbolic acid; later, a weaker (about one per cent.) solution, and finally, when no fetor was perceptible, either in the discharge or breath, a solution of thymol of the usual strength was employed.

There is no doubt that the carbolic acid is the most efficient as a disinfectant, but there is always some danger of carbolic acid poisoning when we have to wash out a cavity under such conditions that we cannot be sure of removing the whole amount of the fluid injected. For this reason, we recommend the following plan for the washing out of fetid lung cavities: Commence to wash out with a two and one-half per cent. solution of carbolic acid; follow this either with a weaker solution or with thymol solution of the usual strength. Let this procedure be repeated at each successive washing out of the cavity until the fetor entirely disappears, and then use the innocent thymol solution as long as there is any considerable discharge from the cavity. When the discharge stops, discontinue the injections.

The dressing of the lung operated upon should consist of voluminous antiseptic dressings; namely, a wad, two to four inches thick, of Lister's

gauze, surrounded by a layer of salicylated cotton, one to two inches in thickness ; the wad of gauze and cotton should cover the entire side of the chest ; over this should be placed a large piece of mackintosh, and outside of this, a set of roller bandages should be applied, to keep the dressings in place.

III. *After-treatment.*—The dressings should be changed as often as may be necessary, according to the amount of the discharge. Smith had the dressings changed every three hours. In Lyell's and also in our own case, the dressings were changed every twenty-four hours. We do not recommend the removal and change of the dressings oftener than once in twenty-four hours, except when the discharge is so copious as to soak entirely through the bandage. Frequent changing of the dressings disturbs the patient, who needs rest.

The medical treatment is simply symptomatic ; quinia, when there is a rise in temperature ; morphia or opiates for the cough ; wine and other alcoholic stimulants to keep up the strength, and nourishing food of any kind, as much as can be taken, are all indicated.

The drainage-tube should be removed when the cavity has filled up, and retracted so as not to retain any fluid in the edges, and when, consequently, the discharge has stopped.

It is important not to remove the drainage-tubes too early, because the external openings are liable to close up before the cavity is closed, as we know from Lyell's case, in which the re-introduction of a drainage-tube that had slipped out was made difficult by encroaching granulations in the canal leading to the cavity, and as we know from general experience from old empyemic fistulæ. In our own case, we think that the drainage-tube was removed too early, and that this mistake placed the patient's life in jeopardy. It will be seen from the history of our own case, that after the removal of the drainage-tube and the closing of the external wound, when we thought everything safe and all right, and the patient was allowed to be up and around, suddenly diffuse bronchitis and broncho-pneumonia set in in the whole upper lobe of the affected lung, and bronchitis in the lower lobe of the other lung. When this serious complication set in we were convinced that it originated from aspirated matter, from the not yet fully closed pulmonary cavity, notwithstanding the absence of any physical signs indicating such a condition of the cavity, and we watched the case from day to day, seriously contemplating the re-opening of the anterior wound and re-entrance to the cavity, if the general condition of the patient should not improve within a few days. The operation, however, did not take place, as the bronchitis and pneumonia subsided under general treatment, combined with inhalations of carbolic acid through a steam atomizer and sponge. Thereafter, recovery was uninterrupted and perfect. .

The secondary bronchitis and broncho-pneumonia is undoubtedly the

main danger we have to encounter during the course and after-treatment of cavities in the lungs, whether surgical treatment has been resorted to or not. It was found to be the cause of death in Lyell's case; it jeopardized the recovery in our own case. In Smith's case no post-mortem examination was made, and in Sutton's and Williams's cases, the records are not sufficiently explicit to throw any light upon this subject.

But from the slight amount of material existing, it seems evident that this bronchitis and bronecho-pneumonia is an essential complication of cavities in the lungs, distinguishing such cavities from fetid intra-pleural cavities and empyemas, and gives an interesting hint as to the importance of effective surgical treatment.

In conclusion, we shall say that the whole subject of the surgical treatment of intra-pulmonary cavities is so new, and the important questions as to all the details so many, that our paper of to-day cannot be considered as attempting to solve any of these questions definitely.

As to the practical value of the operation, the objection might be, and has lately been made, that the number of cases in which this treatment may be indicated is very small. From a scientific and even from a humanitarian point of view, this objection, it is needless to state, is entirely valueless.

That this new field of surgery deserves to be entered upon and have a fair trial is beyond question, not only from a practical point of view, as a temporary relief has been obtained in most of the cases on record, and a permanent cure in our own case, but also from a scientific point of view, as the procedure we have advocated is entirely rational, that is, in conformity with the physiological and pathological facts and laws governing the diseases in question.

We finally hope and trust that our case and our remarks may encourage other members of our profession to take the matter in hand and contribute to the solution of this problem, which even if only occasionally, certainly may save a human life, otherwise irrevocably lost.

120 W. INDIANA ST., CHICAGO, ILLINOIS.

ARTICLE VI.

HYSTERO-EPILEPSY. By CHARLES K. MILLS, M.D., Neurologist to the Philadelphia Hospital; Lecturer on Mental Diseases and Electro-Therapeutics in the University of Pennsylvania.

FRENCH authors distinguish two forms of hystero-epilepsy: (1) Hystero-epilepsy with separate crises, in which the symptoms of hysteria and of epilepsy appear completely independent of each other, and in attacks perfectly distinct; (2) Hystero-epilepsy with combined crises, in

which hysterical and epileptic symptoms are commingled in the same attack. In the first variety the same patient is the victim of two distinct diseases, hysteria and epilepsy. The second, hystero-epilepsy proper, is the disease which will be especially discussed in this paper. It would be best to confine the term hystero-epilepsy to this form. Confusion would thus be avoided.

Between hystero-epilepsy with combined crises, or grave hysteria, and true epilepsy the separation is complete. The disease under consideration is hysteria, not epilepsy. The affinities between hystero-epilepsy and common hysteria have been thoroughly established. The differences are of degree, not of kind. Vulgar or mild hysteria is but the rudimentary state of grave hysteria.

Hystero-epilepsy has long been known under various names—as epileptiform hysteria, by Loyer-Villermay and Tissot; as hysteria with mixed attacks, by Briquet; as hysteria major or grave hysteria, by Charcot.

The greatest impulse to the study of hystero-epilepsy in recent years has been given by the brilliant labours of Charcot and his pupils and assistants, in his famous service at *La Salpêtrière*. In his lectures on diseases of the nervous system¹ (edited by Dr. Bourneville), and in various publications in *Le Progrès Médical* and other journals, Charcot has re-investigated hysteria major with great thoroughness, and has thrown new light upon many points before in obscurity. He deserves immense credit also for the work which he has stimulated others to do.

Bourneville, well known as the editor of some of Charcot's most valuable works, has published, alone or with others, several valuable monographs, both upon hysteria and epilepsy.²

The most valuable work on hystero-epilepsy, however, because the most elaborate and comprehensive, is the recently-issued book of Richer,³ entitled "Clinical Studies on Hystero-Epilepsy, or Grave Hysteria." Richer was for a time interne in the *Salpêtrière* Hospital, and, with Regnard, pursued his investigations under the superintendence and direction of Charcot. His book is a volume of more than seven hundred pages, containing a vast amount of information, and profusely illustrated, in large part by original sketches by the author. Charcot himself has written for it a commendatory preface.

¹ *Leçons sur les Maladies du Système nerveux*. A portion of these lectures have been translated by George Sigerson, M.D., M.Ch., and published by the New Sydenham Society of London, and reprinted in 1878 and 1879 in *The Medical News*.

² Bourneville, *Recherches clinique et thérapeutique sur l'Epilepsie et l'Hystérie*, 1876; Bourneville et Voulet, *De la contracture hystérique permanente*, 1872; Bourneville et Regnard, *Icénographie Photographique de la Salpêtrière*. I have made special use of the second volume of the last of these works.

³ *Études Cliniques sur l'Hystero-Épilepsie, ou Grande Hystérie*, par le Dr. Paul Richer. Paris, Adrien Delahaye et Emile Leerosnier, Éditeurs, Place de l'Ecole de Médecine, 1881.

My object in this paper, after presenting the details of two original cases, is to give a clear and full description of hystero-epilepsy as studied in France. In its preparation I have made liberal use of the valuable volume of Richer, in which is embraced much of the work of Charcot and his scholars. To the kindness of Professor E. C. Seguin, of New York, I am indebted for a copy of the work of Richer.

For the opportunity of studying and treating the following case I am under obligations to Drs. Charles S. Turnbull and J. Solis Cohen, the patient having been for several months under their care at the German Hospital of Philadelphia. Carefully prepared notes of the case were furnished to me by Drs. H. S. Bissey and H. W. Norton, resident physicians at the hospital. I am also under great obligations to my friend, Dr. J. M. Taylor, for a series of sketches of the positions assumed by the patient at different stages of the attack. Dr. Taylor was present with me during one of her worst seizures, and the sketches (Figs. 1, 2, 3, 4) are faithful and accurate representations.

CASE. I.—R., æt. 21, single, was first admitted to the German Hospital November 13, 1879. Between her ninth and twelfth years she had had several attacks of chorea. During childhood she was often troubled with nightmare and unpleasant dreams; she often felt while asleep as if she was "held down by hands." She went to school until twelve years old. Up to this age she was frequently beaten about the head and body. When between twelve and thirteen she went into service. Her menses did not appear until she was nearly eighteen. Before and at her first menstrual epoch she suffered severe pain and cramp. During the first year of her menstruation, while at Atlantic City, the flow appeared in the morning and she went in bathing the same afternoon. She stayed in the water two hours, was thoroughly chilled, and the discharge stopped. Ever since this time she had only menstruated one day at each period, and the flow had been scanty and attended with pain.

According to the patient's story, when about eighteen she kept company with a man for five months, and after having put much confidence in him, learned that he had a wife and two children. This episode caused her great worryment. She positively denied seduction. She became much depressed. She no longer cared for society. In the evening she often went on long trips alone. Once she wandered several miles from her home to Fairmount Park, and was brought home by one of the park guards. She professed that she never knew how she got to the Park.

September 2, 1879, she was seized in the street car with a "fainting fit." On coming-to she found that her left arm was affected with an unremitting tremor. Seven weeks later she was admitted to the German Hospital. She had severe spasmodic attacks, and the diagnosis of hysteria was made. She remained in the hospital about four weeks. On leaving she again went into service. She was re-admitted June 9, 1880, in an unconscious or semi-conscious condition. She had been on a picnic, and while swinging was taken with an attack of spasm and unconsciousness. During two hours after admission she had a series of convulsions. After this she had similar attacks two or three times a week, or even oftener.

I first saw her about the middle of January, 1881. She had an hysterical face; but was possessed of considerable intelligence, and, when ques-

tioned, talked freely about herself. The most prominent physical symptom that could be discovered was a large tremor, affecting the left arm, forearm, and hand. This was constant, and had been present since her admission to the hospital. The left half of her body was incompletely anæsthetic, the anæsthesia being especially marked in the left forearm. Ovarian hyperæsthesia could not at this time be made out. She was, however, hyperæsthetic over the occipital portion of the scalp, and the cervico-dorsal region of the spine. Pressure, or manipulation of these regions, would in a few moments bring on an attack of spasm. The attacks, however, usually occurred without any apparent exciting cause.

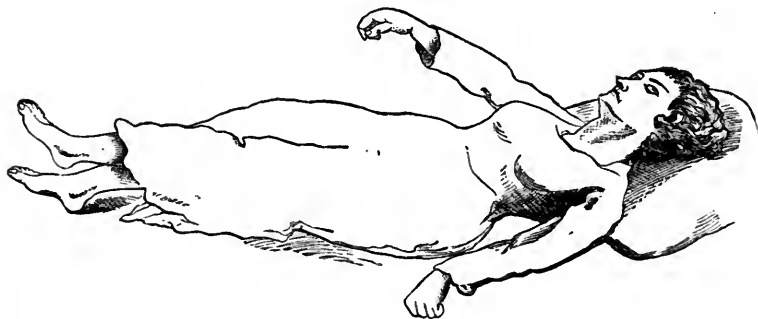
For a period of from six to twelve hours before an attack she usually felt dull, melancholy, and strange in the head. Frequently she had noises like escaping steam in her ears, but more in the right ear than in the left. She complained of cardiac palpitations. She usually had pain in the small of her back. Her limbs felt weak and tired. Just as the attack was coming on, her eyes became heavy and misty, her head felt as if it was sinking backward, and if not supported she would fall in the same direction.

I had the opportunity on several occasions of watching every phase of the attack, or series of attacks, the spasms continuing sometimes from one to four or five hours. The order of events was not always the same, and yet a general similarity could usually be seen in the successive stages of the phenomena. I will try to give an outline of the different stages and phases as observed on an occasion when the seizures were severe.

After lying down, the first noticeable manifestation was a twitching of the eyelids and of the muscles of the forehead and mouth. Her head was next moved from side to side, and she looked around vaguely. Respiration became irregular. In a few moments a convulsive tremor passed down her body and limbs.

Her arms were now carried outwards slightly from the body, the hands being partly clenched. The lower extremities were straightened, the left foot and leg being carried over the right (Fig. 1). Her limbs were rigid.

Fig. 1.

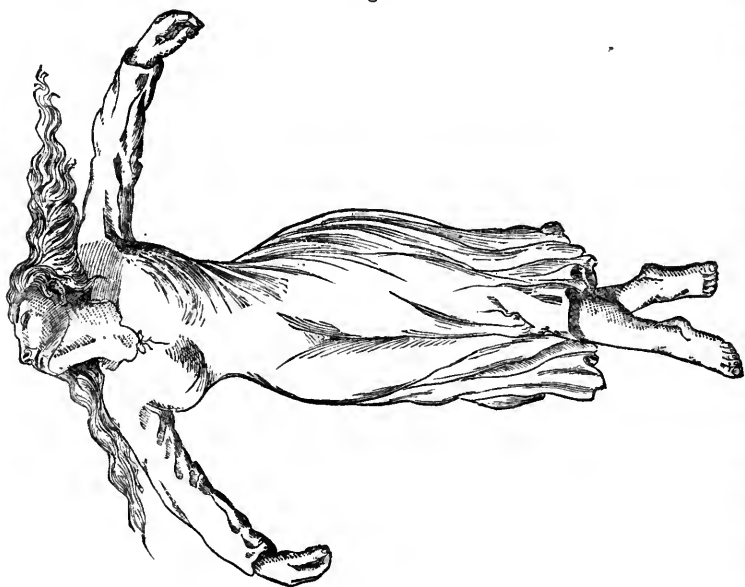


Her mouth was closed, the teeth being ground together. Consciousness was lost, and respiration seemed to stop.

A series of strong convulsive movements next ensued. Her entire body was tossed up and down, and twisted violently from side to side. Sometimes she assumed a position of opisthotonos. Her whole body was then again lifted and hurled about by the violence of the movements.

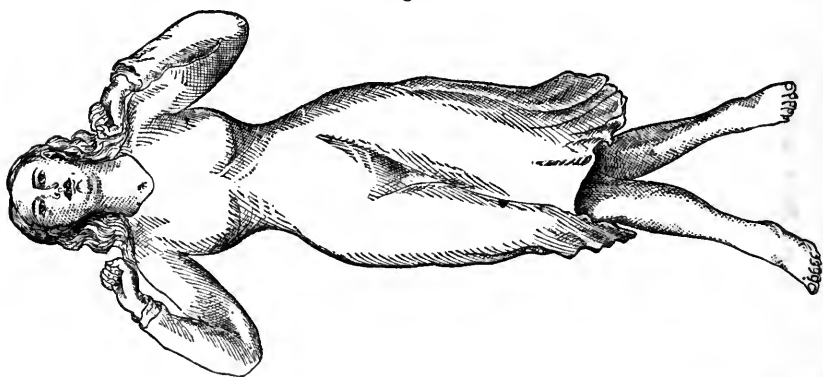
A few seconds later she became quiet but rigid, in the position shown in Fig. 2, corresponding to the position of crucifixion of the French writers.

Fig. 2.



Soon she assumed the position represented by Fig. 3, and the convulsions were renewed with violence, the patient's limbs and body being frequently tossed about, and the latter sometimes curved upwards. After

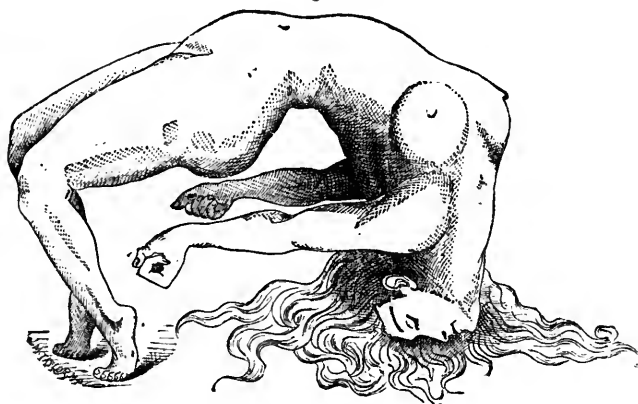
Fig. 3.



these movements had continued a brief period, the patient became calm and partially relaxed. The respite was not long. A series of still more remarkable movements began, chiefly hurling and lifting of the body. Eventually, and apparently as a climax to a succession of efforts directed to this end, she sprang into the position of extreme opisthotonos repre-

sented in Fig. 4. This sketch, by Dr. Taylor, is a very faithful view of her exact position. She remained thus arched upwards for a minute or even more. A series of springing and vibratory movements followed, the body frequently arching.

Fig. 4.



As the spasms left she sat up on her bed, and at first looked around with a bewildered expression. She turned her head a little to one side and seemed to gaze fixedly at some object. Her expression was slightly smiling. When spoken to she looked straight at the one addressing her, but without appearing to know what was said, and the next moment the former position and attitude were resumed. After a few minutes she lay down muttering incoherently, and in about a quarter of an hour fell asleep.

I have simply described one attack. Sometimes she would have several in succession; or the spasmodic manifestations would be repeated several times in a regular or irregular manner. Strong pressure in the ovarian regions usually would not cut short the spasms. They could be stopped, however, by etherization or by active faradization of the limbs or trunk. She did not always conduct herself in the same manner in the period which succeeded the spasms. Sometimes, after getting into the sitting posture, instead of smiling, she would look enraged and speak a few words. The following expressions were noted on one occasion: "You know it! Yes, you do! Yes! Yes!" Often she was heard to mutter for hours after the attack. Her lips would sometimes be seen to be moving without any words being heard. Sooner or later she would fall into a sound sleep which would last several hours.

During the spasms she seemed to be entirely unconscious of her surroundings. To a looker-on her movements seemed sometimes to have the appearance of design; but I soon convinced myself that such was not the case. She was insensitive to painful or other impressions. Her expression was blank and unchanging. She said that the only thing that she remembered about the attacks was that she heard a strange confused sound; this was most probably just as she was returning to consciousness.

Numerous remedies were tried without any apparent effect. These included sodium and potassium bromides, iron, zinc salts, physostigma, cimicifuga, camphor, ether, etc. A uterine examination was made, but nothing especially calling for local treatment was found. She was placed upon equal parts of tincture of valerian and tincture of iron, in half tea-

spoonful doses three times daily. Capsules of apiol were also ordered to be taken three times daily just before and during her menstrual period. Her menses became more profuse and continued longer. The attacks began to diminish in frequency and became less severe. In March, not having had a seizure for several weeks, she left the hospital and again went into service. Six months have now elapsed and she has not had an attack. She reports occasionally at my office. She says that she feels entirely well. The tremor of the left upper extremity has entirely disappeared. She continued to take the valerian and iron for four months, but stopped the apiol after the second or third menstrual period.

For the notes and sketches of the following case I am also under obligations to Dr. J. M. Taylor. The case may, I think, be regarded as one of *acute hystero-epilepsy*.

CASE II.—On a most tempestuous night in January I was called at 11½ P. M. to see a lady who was said to be almost dead. I found a robust looking woman, thirty-two years of age, suffering from what seemed to be severe labour pains. She at once informed me that she feared a miscarriage. She had not long before been married for the second time. She believed herself to be in the third month of gestation. She had previously had a miscarriage at the fifth month. She was eager to have a baby, and fearing a second miscarriage, she had consulted a physician, who prescribed an injection of nutgalls and alum to strengthen the womb. Each of the three or four applications had left a “queer sensation.” Just before sending for me, and after an injection, she had been seized with “cramps” in the womb. I judged her anxiety about a miscarriage well-grounded as her pains were recurring at intervals of ten minutes. A vaginal examination was refused. Morphia was administered subcutaneously. A female attendant injected laudanum and sweet oil into the vagina.

The paroxysms of pain grew farther apart, but became progressively more violent and protracted. The patient rolled about the bed in agony, and yet answered questions, and sometimes gave suggestions. The injections of morphia sulphate were repeated until a grain had been used, but with no apparent effect. The respites, at first passed in quiet conversation, were later occupied by sleep due to exhaustion. Towards half past one o'clock she had a pleasant nap, with regular breathing, which lasted about half an hour; but at the end of this time she abruptly started up in a state of violent tonic spasm with intense dyspnoea. Her eyes were fixed and staring, the angles of her mouth were drawn down. Seizing me by the arm, she pointed to her chest, mutely imploring air. She signed to me to give her a glass of water, which she saw on a table near by. As it was placed to her lips, she grasped my wrist and dashed its contents over her face and breast; but still with no relief. The windows and doors were opened in vain. She fell back with a groan and writhed.

The pupils were neither contracted nor dilated. Internal strabismus of one side and marked injection of the cornea were present. Artificial respiration was attempted. At first the efforts were fruitless, but later they had good effect. She uttered hoarse cries and was convulsed. In her contortions she rolled and tumbled so violently that it required the combined efforts of her husband and myself to keep her in bed. A little later her breathing grew easier. The distressing symptoms now subsided. The entire seizure lasted about sixteen minutes. She passed into

a deep, lethargic sleep from which, however, she could be aroused to answer questions.

Some facts in regard to her previous history were learned from herself and others. Her physique was noticeably fine. She assured me that her health had always been excellent, and that she had a particularly good appetite and digestion. She sometimes over-indulged in delicacies. She had had two attacks of pneumonia, one eight years and the other five years before, the latter complicated with plenrisy. She had recently suffered from slight oppression of breathing on catching cold.

I now insisted on making a vaginal examination, and found a small hard os uteri showing no tendency to dilate. I discovered no evidences of pregnancy.

The interval of repose lasted from 2.15 to 3 A.M. The deep sleep alarmed the family even more than the previous action. I was called upon incessantly to "do something," but was content to let the patient rest. The sleep grew more natural as time wore on. Some officious females roused the patient to see if she was alive, when she peremptorily bid them to "let her alone."

Dr. A. E. Stocker was sent for to see the case in consultation, and came at once through the storm, arriving a little after 3 A.M. The last and most protracted seizure was then under way. It began suddenly, as before, from a peaceful slumber. The poor woman, gasping for breath, choking, the tears streaming down her face, clutched at those about her bed and at the empty air. The action was that of one unable to swim, thrown into deep water, and struggling to catch at a slippery bank. I forcibly manipulated her arms to excite easier breathing, and with some success. Several times she gasped out, "Oh my God!"

Internal strabismus was again noticeable, but neither contraction nor dilatation of the pupils.

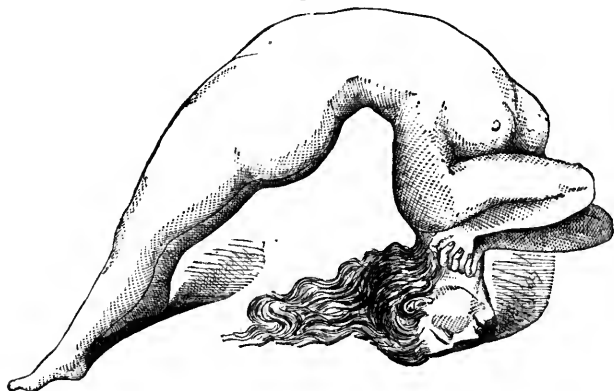
She again writhed about the bed in serpentine curves, contorted and convulsed, frequently arching the back. Presently, raising herself quickly to her knees, in the position shown in Fig. 5, she uttered a series of convulsive sobs and fell back into a state of complete opisthotonos (Fig. 6). This kneeling posture was a favourite attitude, and had been assumed several times before during the paroxysms. The opisthotonos was maintained for only a few moments, when she dropped down and again writhed convulsively. A few moments later her



body was again hurled upwards into the condition of opisthotonos, which was maintained as before for a brief period. The same programme con-

tinued to be repeated. From the backward bow she several times dropped partly on one side, and then wriggled over to her favourite kneeling posture, from which again she resumed the backward arch. The arched position was repeated seven or eight times altogether. The later spasms were of longer duration and firmer balance. Pressure over the ovaries was tried several times while she was in the arched position, but with no effect on the spasm.

Fig. 6.



An application of mustard to the spine was now made on the suggestion of Dr. Stocker. This seemed to have an excellent effect. It was followed by an enema of laudanum and half a wineglassful of water. She now appeared to sleep for a time. We were just beginning to congratulate ourselves, when another paroxysm surprised us. Upon its cessation valerianate of ammonia was administered. This caused intense nausea, and the vomiting of a large mass of undigested food, to the great relief of the patient. Several doses of Hoffman's anodyne were given, the patient continually becoming more quiet and comfortable. The last most severe seizure continued for twenty-two minutes. Several times before daylight she seemed about to have another attack, having some twitching and writhing. These seizures were, however, abortive. She eventually got into a profound sleep. She had no more bad symptoms.

Great exhaustion and soreness of the thoracic muscles were the only noticeable after-effects. The patient never seemed to fear a fatal result, except when during the spasm she appeared to be unable to get her breath. I failed to discover any history of nervous disease in the family. The patient herself had had no tendency to nervous disorders before the present attack. Her urine contained no albumen. One month after the attack the menstrual flow came on naturally. Five months have now elapsed, and she continues in good health.

I will next consider at some length the phenomena of the attack of hystero-epilepsy or grave hysteria, when the disease presents itself in what might be termed the regular and complete type. The cases whose histories I have just given can then be better understood.

The attack of hystero-epilepsy is always preceded, and sometimes for several days, by prodromes which are often numerous and varied, em-

bracing trouble of all parts of the economy. Richer studies them under four heads, namely, 1st. *Psychical affections*, hallucinations; 2d. *Affections of the organic functions*; 3d. *Affections of motility*; 4th. *Affections of sensibility*.

Psychical troubles are the first to appear. For hours or days before the attack the patient is changed. She is incapable of sustained work. She neglects her usual occupations and disdains her amusements. Painful memories are recalled. Insignificant circumstances assume exaggerated importance in her eyes. Sometimes she falls into melancholy, which may go on to a state of profound despair. Her dress is neglected. She abandons propriety almost. Her expression shows the presence of hallucinations. These paroxysms of sadness or melancholy may alternate with moments of foolish gayety. Bourneville and Regnard mention one patient who, three or four hours before her attacks, would begin a long repertory of songs and would not cease until the convulsive crisis. The affective faculties are at the same time exalted or perverted. The patients are unquiet, jealous, suspicious, and very irritable. They sometimes preserve a stubborn mutism; but ovarian compression, so potential in relieving other hysterical manifestations, never fails to loosen the tongues of the most obstinate, even when all other means have been of no avail. They are quarrelsome; they cannot rest; they even turn against inanimate objects, breaking anything upon which they can lay their hands. Their agitation, accompanied at times by great outcries, has sometimes a frightful aspect, but never offers the danger of the delirium of epileptics; they seem simply to be tormented with a surplus of energy and activity. They must be up and doing. Their actions, however striking or frightful, seem to be without cause, without "rhyme or reason" (Moreau).

One of Charcot's patients, whose attacks usually come on at the menstrual period, and last several days, quits work, complains extravagantly and becomes violently agitated, sometimes she strips herself partly, or destroys a portion of her clothing. She leaves her bed. She runs half-naked, her hair in the wind, her head turning backward, balancing her body, leaping first on one foot and then on another, now accelerating and now retarding her steps, and shaking her arm above her head. Intemperate weather proves no obstacle. "I have seen her," says Richer, "in a beating rain, in the mud, work herself into transports." She puts forth ferocious cries, or declaims a senseless discourse; demands pardon of God; pronounces maledictions; deplores her destiny; exhausts herself in supplications, and appeals to heaven and to man for succor. She leaps over benches, strikes herself, and rolls against the walls with complaints and groans. Suddenly she lets herself fall and remains immobile, as if without life; then she gesticulates with violence, striking her arms on the ground and chafing her knees with the gravel, she turns over and over. Sometimes a slight epileptoid paroxysm supervenes. She loses consciousness; her limbs

become rigid in extension; a slight tremor agitates her body. After a few seconds she again begins her disorderly course. A passing contraction of a limb sometimes occurs. The arm is sometimes contracted at the elbow and twisted backwards, the fist clenched; sometimes held in front of the body; or both upper limbs may be in a state of contracture, one before and the other behind the body. Sometimes again the contracture attacks the leg; sometimes it is crossed,—for instance, the left upper and the right lower limb will be affected.

Hallucinations are frequent in this prodromic period. They may affect all the senses, and more particularly those of sight and hearing. The most common hallucinations of sight consist of visions of animals—black cats, gray rats, spiders, ravens, vipers, etc. Fabulous animals are sometimes seen. The vision of the animal or animals is not stationary; it appears to be moving, and in a direction which is always the same for the same patient, as was first pointed out by Charcot. The cats, rats, etc., in passing before the patients, run from the left to the right or from the right to the left, according as the hemianæsthesia is situated on the left or on the right. The point of departure of the hallucination is always from the side of the hemianæsthesia. Most frequently the phantom comes from behind and passes away in front of the patient. These visions may be variously coloured. The patient sees also scintillations, brilliant balls, and diverse colours.

Hallucinations of hearing are not less common than those of sight. They affect chiefly the ear of the hemianæsthetic side. The patients hear music; voices, which appeal, threaten, command, etc.; whistlings in the ear or ears, the rolling of a wagon, the sound of a clock, of a trumpet, of birds which sing in the head, etc.

These hallucinations come during the day, pestering the patients even when in the society of their companions; but during the night they acquire their greatest intensity, becoming visions and noises of the most frightful character. Sometimes the scenes are those of romance; sometimes visions of the dead; sometimes of funeral pageants. The nocturnal hallucinations are often of an erotic character. The patients are the victims of imaginary amours. Lovers come to them and compel them to submit to their embraces. In the morning after these hallucinations they complain of extreme fatigue, and look pallid and dejected.

Troubles of the organic functions, of digestion, secretion, respiration, and circulation, are also among the prodromes in hystero-epilepsy. Want of appetite, perverted taste, vomitings are often present. Nausea is sometimes manifested when no food has been taken, and is due to the spasmodic contraction of the diaphragm, stomach, and œsophagus. Spasm of the throat (*suffocation hysterique*) is a very common prodromic symptom. Borborygmi and tympanites are usually marked. Ptyalism is sometimes observed, and assists in giving rise to the froth which escapes from the

lips during the epileptoid period. Just preceding the attacks the patients sometimes complain of a bad taste in the mouth. The urine is abundant, clear, and colourless. Complaints of oppression and want of air are made. Spasm of the larynx, hiccough, laughing, laryngeal cough, loss of voice, cries like those of animals, yawnings are among the respiratory troubles. Cardiac palpitations, intense and constant, are common. Vaso-motor troubles are not rare; flushing is observed sometimes. Rosenthal reports a case in which the attack was preceded by a sensation of coldness and discoloration of the hands and finger-ends.

Myasthenia, or loss of muscular power, exists as a permanent symptom of hystero-epilepsy, and always accompanies the anæsthesia, appearing or disappearing with it. On the approach of the attacks the muscular feebleness increases; often the patient cannot use the anæsthetic arm or leg. The gait is unsteady. The patients are not solid on their legs. In particular, the limb of the anæsthetic side bends under its weight. Painful cramps, convulsive movements, and tremor, often show themselves. The patellar tendon reflex is exaggerated. The convulsive movements (*secousses*) are similar to those which are met with in true epilepsy. They may be partial or general. If the patient is walking she may be thrown back upon the ground; if sitting down she may be abruptly lifted from her seat to be thrown again heavily. These attacks come on by preference at night, and sometimes hurl the patient out of bed. These convulsive movements, or epileptoid commotions, sometimes occur without the attacks following. They may be considered as the rough draught of the epileptoid period. They are the prelude to the epileptiform convulsion.

Contracture is very often a precursory phenomenon of the paroxysm. It is usually partial, and begins abruptly. It passes from one limb to the other. Sometimes it invades all the limbs. The position of the contracted limbs is very variable, but in the same patient it always reproduces itself in the same fashion. Charcot, Bourneville and Regnard, and Richer, all give admirable illustrations of different forms of contracture. In one case, the right arm and wrist are flexed, and the hand held at the level of the shoulder with the fingers extended. Another while standing becomes immobilized by the contracture, which invades all her limbs. In another, the point of her tongue turns backwards and upwards and glues itself to the palate, and the jaws are tightly closed.

Sometimes slight little epileptoid seizures, which are like detached fragments of the great attack, mingle with the other prodromic signs.

Affections of sensibility are very prominent in the prodromes of hystero-epilepsy. Total anæsthesia is sometimes present, but more often it is hemianæsthesia. It may not be complete; pricking may be felt, but is not painful; the condition, therefore, is analgesia. During the days preceding the attacks, marked anæsthesia, if it does not already exist, may replace the analgesia.

Cutaneous hyperæsthesia limited to certain nerve territories may be met with among the prodromes. Special sensibility is equally affected, and on the same side as the general sensibility. Sometimes we have achromatopsy or colour-blindness. Deafness in one ear has also been observed.

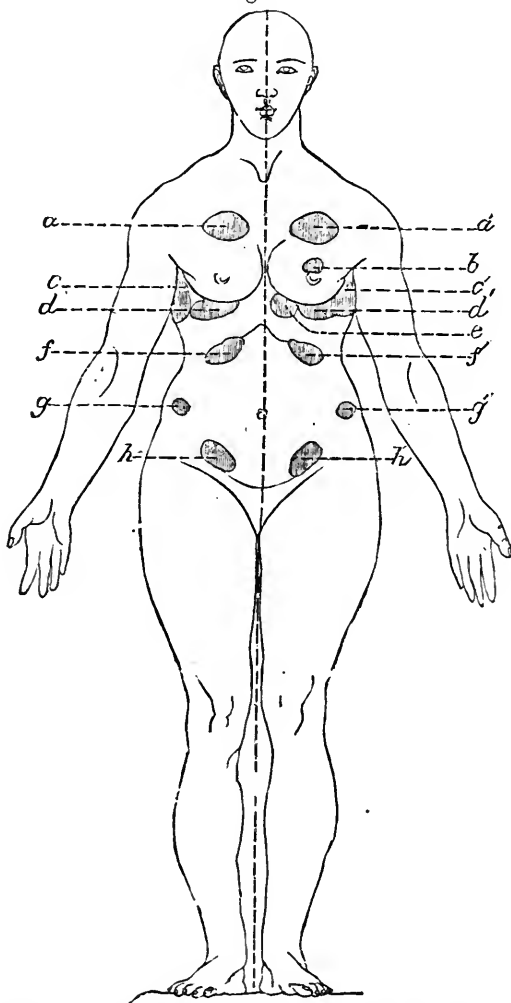
Certain painful phenomena constitute properly what might be called the *aura hysterica*. These are the immediate precursors of the attack. Ovarian hyperæsthesia is the most striking of these. To Charcot we owe the most careful study of this symptom. It is a severe pain; the patients cannot support the least touch. A certain degree of swelling of the abdomen may be present. Sometimes the pain does not show itself spontaneously; pressure is required to discover it, in which case anæsthesia of the skin and muscles is present, showing that the seat of the pain is not in the skin or muscles. The seat of pain, according to Charcot, is without doubt the ovary. He gives the following rule for localizing it: "From a line uniting the anterior superior spines of the ilia, let fall the perpendicular lines which form the lateral limits of the epigastrium, and at the intersection of these vertical and horizontal lines will be found the focus of pain."

Among the most interesting prodromic affections of sensibility are the *hystero-genic* or *hystero-epileptogenic zones*. These have been well studied and described by Richer, from whose work Figures 7 and 8 have been taken. Brown-Séquard has shown that some lesions of the spinal cord, of the medulla oblongata, and of the nerves, and in particular of the sciatic, will determine in lower animals the production of an affection, in which manifestations which approach closely those of epilepsy, show themselves a certain number of days after the experimental traumatism. These animals thus rendered epileptic are sometimes attacked with convulsions spontaneously; but it is also possible to provoke these attacks by exciting a certain region of the skin which Brown-Séquard designates as the *epileptogenic zone*. This zone, situated on the same side of the body as the nervous lesion, has its seat about the angle of the lower jaw, and extends towards the eye and the lateral region of the neck. The skin of this region is a little less sensitive than that of the opposite side, but touching it most lightly provokes epileptic convulsions. The simple act of breathing or blowing on it brings about the same result.

Something analogous to this epileptogenic zone has been noticed among hystero-epileptics, and has been pointed out by several writers, among whom Richer mentions Willing and Turk, Charcot, Schützemberger, Rosenthal, and Baillif. Richer gives the particulars of a number of cases. In one patient the hyperæsthetic zone was between the two shoulder-blades. Simply touching this region was sufficient to provoke an attack, and this was more easily done if near the time of a spontaneous seizure. After the grave attacks, the excitability would seem to be exhausted, and pressure in the zone indicated would not cause any convulsive phenomena.

A second case presented a similar condition. If touched over the dorsal spine between the shoulders, she felt a violent pain in the belly, then a sense of suffocation, which brought on at once a loss of consciousness.

Fig. 7.

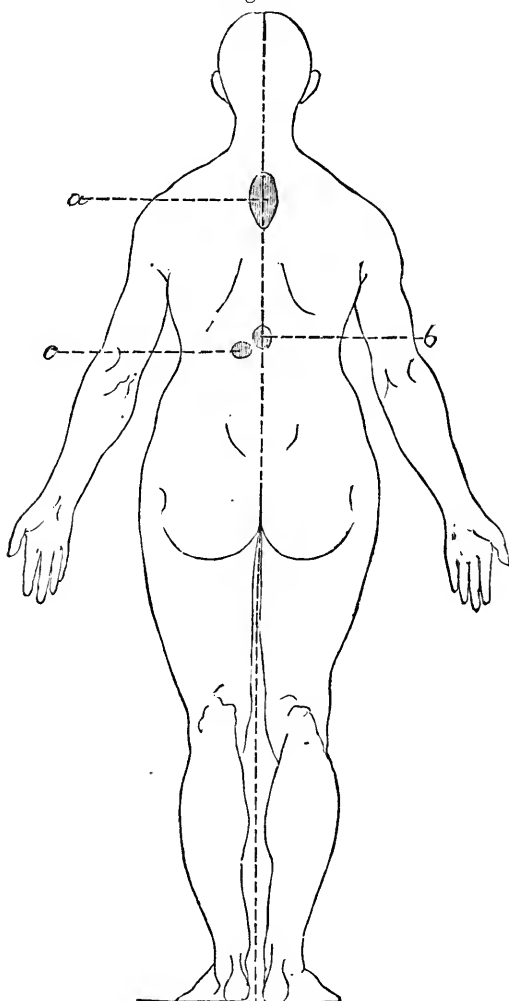


Principal Hysterogenic Zones, anterior surface of the body. *a, a'*. Supra-mammary zones. *b*. Mammary zones. *c, c'*. Infra-axillary zones. *d, d', e*. Infra-mammary zones. *f, f'*. Costal zones. *g, g'*. Iliac zones. *h, h'*. Ovarian zones.

In a third patient the hysterogenic zone was different. It was double. It was necessary to touch two symmetrical points situated to the outside and a little below the breasts in order to bring on the hystero-epileptic convulsions. Touching one of these points did not produce any result. Other cases are given in detail, but a glance at the two Figures (7 and 8),

will show some of the principal hystero-genic zones both for the anterior and posterior surfaces of the body. A zone of ovarian hyperæsthesia was common to all the patients. It did not differ essentially from the other hystero-genic zones. If the ovarian hyperæsthesia existed along with

Fig. 8.



Principal Hystero-genic Zones, posterior surface of the body. *a.* Superior dorsal zone. *b.* Inferior dorsal zone. *c.* Posterior lateral zone.

other hystero-genic points, the excitation of the ovarian region was always the most efficacious. The hystero-genic zones occupy diverse points of the skin and of the deeper-seated parts; but if they vary in different patients, they always occupy the same place in the same case. They are found on the trunk exclusively; they are more frequently in front than behind; in

front they occupy lateral positions and are often double and symmetrical; behind they are more often single and median; they exist more frequently to the left than to the right, and the unilateral zones have always been met with on the left side.

The hysterogenic zones bear no constant relation to the hemianæsthesia. It is true that the ovarian pain is most often seated on the hemianæsthetic side, but sometimes it is present on the opposite side. Very often the zone is in the median line. Cases are given in which it was double with hemianæsthesia and total anæsthesia, in which it was single and to the left with anæsthesia of both sides. Various other irregularities between the anæsthesia and the hysterogenic zones have been observed.

The hysterogenic zones are not at all times equally excitable. They are more so when the convulsive attack is imminent. The patient about to have an attack is compared to a vessel too full, the least shock causing it to run over, or, better still, to a Leyden jar the least contact with which occasions a discharge. When the patient is discharged by the convulsion, the hysterogenic zones lessen in excitability or disappear completely. Other circumstances, such as a vivid emotion, will sometimes cause the same diminution or disappearance of the excitability.

Ovarian pressure gives rise to the spasmodic attacks; the same pressure arrests them. What is true of ovarian compression is equally true of all the hysterogenic zones. A light touch brings on the convulsions, which have scarcely commenced when they can be stopped by a new excitation of the same point. In general the excitation to arrest the convulsion should be stronger than that which determines it. When a patient possesses several hysterogenic zones, the attack occasioned by exciting one can be arrested by acting upon another.

In Case I. many of these prodromic manifestations were not wanting. I have no notes of special psychical troubles, wild excitement, or marked hallucinations. For several hours before the attack, however, she was unusually dull and melancholy, and complained of a strange feeling in the head. She frequently had noises like escaping steam in her ears. She had cardiac palpitations. Her limbs became weak and felt tired. The left half of her body was incompletely anæsthetic. Ovarian hyperæsthesia was never very clearly made out. She had a distinct hysterogenic zone on the posterior aspect of the body, including the median occipital region of the scalp and the cervical and upper dorsal district of the spine, a portion of the irritable area corresponding to the superior dorsal zone of Fig. 8. The twitchings, movements of the head, irregular breathing, and convulsive tremor, just preceding loss of consciousness, belonged properly to the prodromic stage.

In Case II. no opportunity to study prodromes was, of course, afforded.

The attack having fully begun is divided by Richer into four distinct periods:—

1st. The epileptoid period.

2d. The period of contortions and of great movements.

3d. The period of emotional attitudes.

4th. The period of delirium.

The periods themselves are subdivided into phases.

The first or *epileptoid* period of the hystero-epileptic attack, receives its name from its resemblance to a seizure of true epilepsy, in which three phases always reproduce themselves in the same order, namely:—

1st. Abrupt tetanization of the muscles of the entire body, with, at the same time, visceral spasms and loss of consciousness.

2d. Clonic convulsions of the tetanized muscles.

3d. General resolution and stertor.

The epileptoid period of the hystero-epileptic attack, in like manner, is best divided into three phases:—

1st. A tonic phase.

2d. A clonic phase.

3d. A phase of resolution.

When the epileptoid period comes on spontaneously it is usually preceded by various convulsive phenomena already alluded to in speaking of the prodromes. During the few seconds that these phenomena last, the patient is conscious of what is passing around her, but her intelligence is becoming obscured. Soon the three phenomena come on which mark the beginning of the epileptoid phase, namely loss of consciousness, arrest of respiration, and muscular tetanization. If the attack is brought on by outside interference, by pressure, excitement, etc., the patient may fall with great suddenness. Sometimes an attack surprises the patient during her sleep.

Loss of consciousness is complete during the entire epileptoid period.

According to Charcot the cry which marks the onset of an attack of true epilepsy is not a manifestation here, although sounds due to spasm of the muscles of the larynx and throat are sometimes heard.

In the tonic phase of the epileptoid period the muscular tetanization does not arrive at once at its maximum. In the first place we have a tonic phase with movements of large radius, or tonic convulsions. These have a certain slowness; they are executed by parts of the body the muscles of which are already rigid and contracted. Sometimes, the muscles being rigid in extension, the convulsions produce a displacement of the entire limb; more frequently the movements are those of circumduction.

The head turns backwards slowly, causing the neck to jut and appear swollen; or it rotates, turning the face to the side where the convulsions predominate; sometimes it remains straight, a little inclined forward and sinking between the shoulders, which are elevated. The face, excessively pale at first, soon becomes congested. The forehead is wrinkled; the eyes are convulsed and hide their pupils beneath the upper lids, or they roll in

their orbits. The pupil is usually dilated; sometimes, on the contrary, it seems to be contracted. The mouth opens widely, and the tongue is sometimes put out and moved from one commissure to the other; or, on the other hand, the jaws may be firmly closed, or the patient may fiercely grind or gnash the teeth. Respiration is arrested. The swelling of the neck here seen is not met with to the same degree in true epilepsy.

After the tonic convulsions the patients often become immediately immobile through muscular tetanization carried to its height. The position of the patient thus immobilized is variable; most frequently it is in complete extension and dorsal decubitus. The head is thrown backwards, the neck swollen, the veins standing out like cords. The face is cyanosed, puffed, the features contracted and immobile. Froth appears sometimes on the lips. The arms are extended in adduction and in rotation outwards, the wrist flexed, the fist shut; sometimes the two hands, drawn towards the middle of the body, touch by their backs and even may cross. The inferior extremities are equally in extension, the knees strongly brought together, and the feet clubbed, turned either inward or outward. The trunk, stiff as a bar of iron, rests on the back or on one of the sides. It is frequently curved backwards.

One of the positions assumed in this tonic phase is well represented in Fig. 9.

Fig. 9.



The position just described is that which is most common, but it has many variations. The trunk and the limbs, diversely flexed and extended, give to the patients unforeseen and bizarre positions, which would be confounded, without care, with the contortions of the second period; but on close examination, we find that we have muscular tetanization added to the important epileptoid phenomena—loss of consciousness and respiratory spasm. Sometimes the body, curved backwards, simulates to some extent the arched position, the arms, at the same time, extended perpendicularly to the trunk, produce the position of crucifixion, which is also an emotional attitude of the third period.

The tonic phase, which lasts usually about half a minute, is followed by the clonic phase of the first period. This begins by rapid and short oscillations of the tetanized limbs. Sometimes these clonic movements are general, affecting the face, head, trunk, and limbs. More frequently they predominate on one side of the body, and they may be confined exclusively to one side. They surprise the patient in the position taken in the tonic phase; the body, little by little, quits the tetanic position. The suspended respiration returns painfully; inspiration is whistling, expiration jerking; at times hiccoughs occur; noisy movements of deglutition are heard; and the abdomen is agitated with convulsive movements and sonorous gurglings. A calm succeeds, little by little, and ushers in the third phase of the first period, that of muscular resolution.

In the phase of muscular resolution, the muscles are completely relaxed. Movement is absent. The patient lies on her back, the head sinks down upon one shoulder, the face is congested and slightly swollen, the eyes are shut, respiration is established more regularly, but at times is noisy. Sometimes a true stertor is present. Occasionally a certain degree of contraction persists in the entire body or in a limb. The sleep is sometimes interrupted by general convulsive movements, which may completely elevate the patient or roll her together into a heap.

The epileptoid period usually lasts altogether several minutes, two, three, four, or five, rarely more. The phase of stertor and resolution may be prolonged, but the tonic and clonic phases, when they are complete, show a remarkable regularity as regards duration. Numerous observations always gave a total approaching sixty seconds for both the tonic and clonic phases. The sixty seconds could usually be divided so as to give one-half to the tonic and one-half to the clonic phase. The tonic phase even may be subdivided into two equal parts of about fifteen seconds each. The above subdivisions, although noted as the result of many observations, are approximative; the duration of the different phases is susceptible of great variations.

The epileptoid period, complete and regular, has been described, but it may undergo modifications and thus give rise to varieties. It is modified above all either by excess or by deficiency. One of the phases may be prolonged to the detriment of the others, or one or even two of the phases may be wanting.

The second period is that of *contortions and great movements*. Charcot has given to this period the name of *clonism*. This period comprises two phases: 1st. That of illogical attitudes or contortions; 2d. That of great movements.

I will recall here in some detail the accounts given by Richer of these illogical attitudes. For one of these attitudes most of the patients seem to show a marked preference. It is reproduced almost always in nearly the same fashion, and merits the name of the arched position (*arc de*

cercle). In the most common form of the arched position, the body is curved backwards in the form of an arch resting only on the head and the feet. This position is represented in Fig. 10, from Bourneville and Regnard's *Iconographie Photographique de la Salpêtrière*.

Fig. 10.



This form of contortion, the arched position, presents varieties. One patient keeps only one foot on the floor, holding the other in the air. The curve of the body may be more or less complete. Sometimes the patient rests on the upper part of the back or on the shoulders, instead of the head. The patient may rest on the belly or side, the remainder of the body preserving its curved position. Instead of being curved backwards, she may be curved forwards, the posterior plane of the body forming the convexity of the arch.

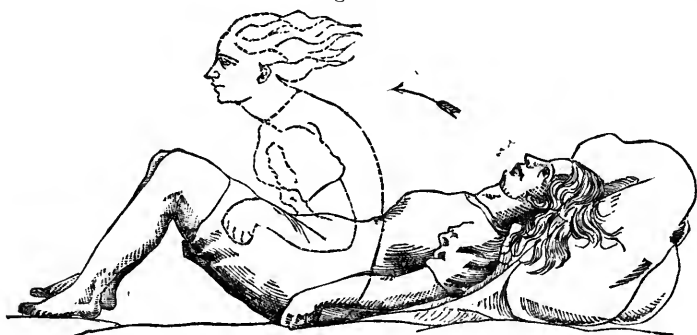
In this phase of the attack the body may assume strange and seemingly impossible attitudes almost without number, some form of the arched position often being discoverable. When the muscles of the face participate, frightful expressions are sometimes produced.

The second phase of the second period of the grave attack is that of *the great movements*. These movements separate themselves from the clonic phase of the first or epileptoid period in that they are much more extended, and do not have any connection with tetanization. They are not compatible with any degree of contracture, and one of the conditions of their production is complete muscular relaxation. They are executed by the entire body or by a part of the body only.

The same movement is sometimes reproduced a number of times in succession with great rapidity and regularity. One of the most frequent of these movements is that represented in Fig. 11, and has been termed the movement of "salutations." It consists in an abrupt flexion of the trunk until the forehead strikes against the knees, then the body quickly straightens itself again, and the back and head violently strike the pillow. The patient takes a point of support, with her feet on the bed, the legs being semi-flexed.

Sometimes the movement is performed by the legs, semi-flexed, being projected upwards, the head and body remaining at rest ; or both the head and the legs participate. At other times it is more local ; it is perhaps executed by a single member. One patient would quickly lift her body

Fig. 11.



to the arched position until it rested on the feet and hands only, and then would fall again to the bed. She would thus rebound from five to twenty times in succession. Another would suddenly launch her legs in the air, assuming three positions : (1) resting on her back and head, the feet and legs directed nearly straight upwards ; (2) resting only on the shoulders and head, the body as well as the legs being projected upwards ; (3) resting on the back of the head, the body and legs, unsupported, being hurled into the air at a considerable elevation.

This phase of great movements is often marked at its beginning by a piercing cry, similar to the whistle of a locomotive, prolonged, and sometimes modulated. The movements do not always preserve the same regularity. They consist sometimes of a sort of writhing or wrestling. They are followed sometimes by a sort of fury. They are susceptible of numerous variations, hard to classify. One patient imitates the noise of a locomotive on its journey. The contortions and the great movements nearly always present themselves with the same characters in the same patient. Loss of consciousness is not the rule during this period of clonism as during the epileptoid period. Hallucinations are sometimes present.

The third period of the hystero-epileptic attack, called by Charcot the *period of emotional attitude* or *statuesque positions*, is not always as clearly separated from the second period, as the second is from the first. The delirium which marks this period may begin in the latter part of the second period. An interval of repose between the two periods is rare. It is the most dramatic stage of a highly dramatic disease. The patient is a prey to hallucinations which ravish and transport her to an imaginary world.

When the patient is awakened, she remembers what has passed in this period. During it she is completely insensible to outside excitation.

Two processes only will cause her dream to vanish and bring her back to reality: these are irritation of the hysterogenic zones, particularly ovarian compression, and the electric shock. The subject of the hallucinations is most frequently borrowed from the past life of the patient. Sometimes, however, the hallucination is a pure creation, which varies with the richness of her imagination. Usually, two phases of hallucinations can be distinguished: (1) the phase of gay hallucinations; (2) the phase of sad hallucinations. These may succeed each other, or may intermingle.

I will give a few illustrations of the shapes taken by these hallucinations.

One patient, reported by Richer, retraces by her exclamations and positions, chiefly two events of her existence: the first, terrible in character, marked her entrance into life; when ten years of age she became the victim of lust. The second has reference to a lover, and causes her a pleasure which she does not seek to dissimulate. The details of her hallucinations are given by Richer with great minuteness. I will glance at some of the chief points in order to make clear the nature of this emotional period. During the phase of great movements her physiognomy indicates that the hallucination has commenced. She seeks to escape from her persecutor. The movements terminate with much agitation. The patient seems struggling to escape from some one's grasp. She cries for help, reproaches, opposes. Suddenly, she supplicates, her arms extended forward, she rolls on her bed crying, "Pardon! Pardon!" Sometimes with a vigorous movement she gets up again, and then throws herself on her knees in the position shown in Fig. 12. Her voice is always supplicating, full of anguish and terror. She falls again on her bed, lies upon her back, extended in the position of the cross, cries of anger and fright still escaping from her. Still later she becomes menacing and furious. The threats are sometimes interrupted by blows. She cries for pardon and again reproaches. Nearly all her words are spoken in low tones.

Another scene now passes before her. It is a pure creation of the imagination, but none the

Fig. 12.



less fills her with fright. She sees an immense chariot covered with funereal drapings and full of frightful skeletons, whose hollow eyes dart forth fire.

Sometimes by a sudden transition the gay phase of her hallucination comes on. A gesture of terror or menace is suddenly interrupted. The patient is as one charmed by an apparition; she shows astonishment, surprise mingled with joy; her look is directed upwards. She extends her arms, and exclaims, "Oh come! come!" She appeals pressingly and repeatedly to the apparition to come. Finally, she lies down on her back, opens her arms as if to draw the phantom to her, and covers it with kisses. She becomes calm little by little. She mocks at some imaginary personage. She listens, exclaiming: "Hark! Hark!—Oh! the beautiful music!" It is military music in a great garden where she walks on the arm of her beloved. This hallucination always marks the approach of the end of the attack. Soon she sees rats; movements of fright and lamentations follow. The delirium of the fourth period begins.

Other cases are related by Bourneville and Regnard, and by Richer, some at great length and with vivid details. Camera and pencil are frequently called to assist the pen in presenting scenes which read as if drawn from an exciting drama or novel. A large number and great variety of emotional attitudes are sometimes presented by the same patient during a single attack. Positions are taken by some that are not assumed by others. The same patient commonly repeats many of the same attitudes in different attacks. Among the expressions and attitudes which Bourneville and Regnard have succeeded in photographing are those illustrating emotions of menace, appeal, amorous supplication, erotism, ecstacy, mockery, beatitude, etc.

The positions assumed correspond with the expression of countenance. The patient kneels with clasped hands and a supplicating look; with fists clenched and arms tense, with one foot advanced and with head and body half rotated, she frowns defiance; she lies upon her back with joyous face, and with body and limbs keeping time to a jolly song; with laughing features she claps her fingers together as if imitating a performance with castanets, etc. etc.

The position of crucifixion (*crucifement*), as shown in Fig. 13, from Bourneville and Regnard's *Iconographie Photographique*, is one not infrequently assumed, often with some beatific expression. This position of crucifixion, as I have already pointed out, is sometimes also seen in the spasmodic phases of the attack.

Hallucinations of sight occupy a prominent place in the third period. One patient sees huge beasts with immense wings, enormous claws, and a great crooked beak; another always sees two men, naked except a girdle, covered with hair, and of repulsive appearance; another sees red lions and lizards with red beaks.

This period varies in its exhibitions according to the richness of the imagination of the patient. On a slender groundwork drawn from the real life of the patient variations and extensions without number are developed. The attacks also are sometimes modified by vivid impressions received in the intervals between them.

Fig. 13.



Richer summarizes as follows the principal distinctive signs of the period of emotional attitudes :—

1. The emotional attitude always expresses a sentiment, an action, or a thought.
2. During the emotional attitude, the intellectual faculties are active ; hallucination is always present.
3. During the emotional attitude, general and special sensibility are completely abolished, but the patient preserves her liberty of movements.
4. After the emotional attitude, the patient retains the memory of her hallucinations.

After the period of emotional attitudes or statuesque positions, properly speaking, it might be said that the hystero-epileptic attack is terminated. Consciousness returns, but only in part, and for a time the patient remains a prey to a delirium whose character varies. It is interwoven with hallucinations and accompanied sometimes by some troubles of movement. This delirium is regarded by Richer as constituting a fourth period, into which the patient passes before regaining her normal equilibrium.

The delirium is most often one of memory ; it refers to the events which

have marked the life of the patient. It is sad and melancholy. The patient recounts her entire history and accompanies it with lamentations which sometimes have a thrilling accent of truth. One patient, for instance, nearly always ends her attacks with some such discourse as the following :—

“ Ah! poor Gen.!—who can understand my grief! God only.—I ought not to receive him. He outrages me; I ought to be his wife, he makes me his mistress; but I love him too much. All is lost for me!”

All at once she straightens herself up, and gazes with eyes filled with tears as if at some one who approached her bed. She cries out again, menacing, reproaching, entreating to be given something which will cause her to die, etc. Sometimes her sad delirium takes on a frightful character. She works herself into a fury. The uproar and fury cease, as by enchantment, when, having extended her on her back, the ovary is compressed. Usually, however, her delirium is of a calmer character, and she begins a long history of her adventures.

The delirium of this fourth period may be concerned with subjects the most varied. It may be gay, sad, furious, religious, or obscene.

The delirium is mingled with hallucinations; voices are heard. Sometimes she sees personages who are known; sometimes the scenes are purely imaginary. After a period of melancholy delirium, one patient first sees a journeyman painter who often visited her when she was young; then a dog which murdered her brother; at other times she imagines that she puts her feet in water; or she sees black beasts, great rats, etc. Another patient is assailed by vipers and crows. A third sees toads, spiders, and rats.

Fig. 14.



One of the patients, whose attacks terminate by a phase which presents in a high degree the characters of the fourth period, at the end of the attack always presents the same acts and the same hallucinations. She rubs her hands and her eyes, and demands to have her sight restored. She kneels on her bed, her face against the sheets, and “blows the fire” (*souffle le feu*), Fig. 14; she cries “A cat! a cat!” She tumbles over.

She asks to drink, and drinks with the goblet between her teeth ; she hears great bells and sees beasts.

During this fourth period the patients will sometimes make the most astounding statements and accusations. They will wrongfully charge theft, abuse, etc., upon others. They believe in the reality of their hallucinations, and, what is more important, they will sometimes persist in this belief after the attack is over. In this way we should probably account for the accusations which, in the times of sorcery particularly, unfortunates sometimes made against themselves, of commerce with the devil, or with innocent individuals.

General or partial contractures sometimes occur during this fourth period ; but without loss of consciousness or absolute immobility.

The third and the fourth periods are sometimes confounded. The propriety of making two periods of them has been questioned. The boundaries between them are not always clearly marked. In reality, however, on close study, each will be found to possess characters sufficiently precise and distinctive to authorize their separation. In one period is a delirium of memory, in the other of action. In the fourth period the patient converses and recites ; in the third she acts. Here it is mimicry, with various attitudes ; there it is words, discourse. The hallucinations of the third are replaced by illusions in the fourth. The mobility of the conceptions of the fourth is opposed to the special character of the hallucinations of the third. The delirium of the fourth is varied and infinite. In the third the patient is completely distracted from the outside world ; in the fourth she is not altogether inaccessible to external influences.

Not rarely muscular contractures or paralyzes after hystero-epileptic attacks have existed several years, ceasing abruptly after a convulsive attack. Facts of this kind sometimes pass as miracles.

Urine, abundant and clear, is not infrequently passed at the end of an attack. Matthieu speaks of the "emission of a sort of vaginal mucus, so frequently observed at the end of attacks of hysteria, and which authors have considered as a sort of feminine spermatic fluid." (?)

A young woman, reported by Cerise, had several times during the day light attacks of hysteria, which terminated by an abundant salivation.

When the four periods described succeed each other in order they constitute a regular and complete attack of hystero-epilepsy. The epileptoid period lasts at least from one to three minutes. Usually it is clearly separated by a moment of calm from the second period, that of contortions and great movements, the duration of which is not quite equal to that of the epileptoid period. The line of demarcation is not as sharp between the emotional attitudes and the second period, the hallucination commencing sometimes during the latter. The period of emotional attitudes may last from five minutes to a quarter of an hour. These three periods, which constitute the attack proper, have altogether a duration of from a

quarter to half an hour. The fourth period, which is rather a sort of prolongation of the attack than a part of the attack itself, may be very short, a few minutes only, or it may be much prolonged.

An attack of hystero-epilepsy is rarely isolated. It is usually repeated several times, constituting the hystero-epileptic status (*l'état de mal hystéro-épileptique*). In the series of attacks sometimes the seizures commingle; one attack is not finished before another begins; sometimes the attacks are separated by an interval of lucidity of greater or less duration. The series may be prolonged for hours or days. Charcot has pointed out one very important character by which the hystero-epileptic can be separated from the epileptic state. In the *status epilepticus* the temperature is very rapidly elevated and to a high degree, the situation becoming more and more grave; on the contrary, in the protracted hystero-epileptic status the temperature scarcely passes the normal figure, and the concomitant general condition is not one to inspire inquietude. The attacks which compose a series are not all of equal duration nor perfectly alike. At first they are violent; towards the end they become extended, gaining in extent what they lose in intensity. Richer compares the patient to a music-box which possesses several different airs, but disposed in an invariable order.

By comparing the notes upon Case I. with the description given of the typical hystero-epileptic attack, I think it will be seen at a glance that the case is one of true hystero-epilepsy. The different periods, and even the phases, can be made out with but little difficulty. After a few moments of convulsive movements and irregular breathing, she was attacked with muscular tetanization, arrested respiration, and loss of consciousness. Tonic convulsions followed, and then immobilization in certain positions as represented in Figs. 2 and 3. Next came the clonic spasms and resolution. In the period of contortions the arched position is one more extreme than any represented by the illustrations of Bourneville and Regnard, although it is closely approximated by fig. 44, page 81, of Richer's work. After this position of opisthotonos had been taken a succession of springing and lifting movements occurred, probably corresponding to the phase of great movements. The period of emotional attitudes was very clearly represented, by the position assumed, the expression of countenance, and sometimes by the words uttered. Even the period of delirium was imperfectly represented by the mutterings of the patient, which were sometimes long continued after the attack.

In Case II. the spasmodic manifestations, both in their nature and method of succession, were like those of hystero-epilepsy, but the different periods and phases of an attack do not seem to have been so clearly defined. It appears to have been an acute attack occurring in a hysterical woman.

Richer applied to his studies of hystero-epilepsy the graphic methods of

Marey, making use of the latter's myographic apparatus. The drum was most frequently applied to the muscular mass on the front of the forearm. The apparatus registered the modifications in muscular contraction during the convulsive movements. This graphic method enabled a more thorough division of the periods into phases to be made. Many interesting traces are given.

From the large number of cases reported by Richer I have selected the following for translation, because, as this author says, it would be difficult to find one more complete and more confirmative of the description of hystero-epilepsy which has been given. By a study of this case, in connection with Case I., a very accurate idea of the typical hystero-epileptic attacks can be obtained.

CASE III.—Suzanne N., nineteen years old, small, a brunette, of nervous temperament, very irritable, has received some education, and is gifted with quick intelligence. For a long time subject to attacks of unjustifiable anger, to frights without cause, she has finished by having nervous crises, which, increasing little by little in gravity, have rendered her stay in her family intolerable and forced her parents to ask for her admission to the hospital of Salpêtrière, which she entered March 24, 1879.

She is totally anæsthetic and analgesic. The points of analgesia, irregularly distributed over the surface of the body, appear to predominate around the great articulations. The ovarian hyperæsthesia is double with a predominance on the left side. The patient, moreover, possesses two other hyperæsthetic points the excitation of which even lightly can determine the attacks. One of these hystero-genic points is on the left side below the breast. The other is on the posterior portion of the trunk at the boundary of the lumbar and dorsal regions of the left side, one finger's breadth to the left of the median line and three fingers' breadth below the inferior angle of the shoulder-blade.

A violent and unforeseen noise occasions an attack of catalepsy. She is very susceptible to the practice of hypnotization.

The hystero-epileptic attacks are remarkable for their regularity and their conformity to the type which has been described. They differ in one point of detail, very interesting and due to the predominant role which the imagination plays in the scenes of hallucination and of delirium of the last two periods.

Prodromes.—Suzanne is warned several days before the invasion of the attacks; she "feels them coming." Meanwhile a strong emotion can make the attacks explode all at once. When, as is most usual, they are preceded by prodromes, she recognizes what is coming. She must be stirring, fuming, she "feels jolly." At other times she has visions of animals; these are of spiders, rats, of monkeys which run on their four paws, and make faces. All these apparitions appear on her left, and pass away always in the same manner, that is, from the left to the right. The ovarian pain becomes very sharp; it is double, but with more intensity on the left. Soon she experiences what she calls false alarms. The painful phenomena of the hysterical *aura* develop spontaneously, to the point of making her believe that the attack is imminent, but the crisis holds back and miscarries. The *aura hysterica* presents a succession of points frequently observed. At the beginning is increase of ovarian pain, then precordial pain, palpitations, a sensation of suffocation and strangulation, finally, beatings in the temples, buzzing, whistling in the ears, obscuring of sight, and loss of consciousness if the attack occurs. The phenomena are present on both sides, but with marked predominance on the left. The hystero-genic zones, it will be recalled, are on the left side.

September 18, 1879.—Suzanne N. is in the middle of a grave attack at the time of the morning visit to the wards. According to the usual custom the attacks succeeded each other forming a series. We note several of these.

I.—(a) The epileptoid period is well marked but short. The tonic and the clonic phase can be very clearly distinguished.

(b) After some brief moments of calm, the patient puts herself into the arched position, and gives forth shrill outcries. She sinks down in the bed, becomes distorted, and finishes by placing herself in the arched position with her arms behind her back, and resting on her belly. She puts forth anew great cries.

(c) Her look becomes animated; she straightens herself to a half sitting position in bed; her physiognomy expresses terror; her right elbow is elevated as if to defend herself; she seems to threaten, but soon fright gains on her; she turns from one side to the other as if to escape the pursuit of an enemy.

Suddenly her expression changes: she looks fixedly above, whilst both joy and admiration are painted on her features. She lifts up her two hands in a sort of attitude of ecstasy. "Ah! how beautiful they are!" she says, with an accent of profound admiration. She executes with the head and arms a movement of well-timed balancing. "Ah! how pretty they are! Those women in the boat!—and those men lying at their feet! Mythology (*sic*) passes there. One sees nothing else clearly, all is dark around, but these are illuminated as by an electric light. Ah! how it rocks." She imitates with her arms and head the movements of the boat. All at once she cries out full of anguish: "Ah! they will fall!" She then covers her face with her hands, cries out with terror, and hides her head in the pillow.

(d) Soon she sits up again in bed and begins to talk. She has no more hallucinations. "Oh! certainly, I will be an actress—so—they shall not take from me the idea. I will enter the conservatory, I will study two years. Then I will go on the stage, I will declaim, I will be like Sarah Bernhardt. 'This light which I see again still breaks my heart!'" (She delivers this phrase in a theatrical tone.) "It is no more difficult than this—When we speak, believe what we say, and that is all."

All at once a new attack comes on.

II.—10.10. (a) The epileptoid period lasts one minute. The tonic phase takes place with extension; the clonic movements are very well shown; froth flows from the lips.

(b) The patient cries out with rage and is agitated. The arched position follows, while the belly undergoes rapid undulations. The patient turns from one side to the other, performing a sort of rolling movement. She evinces rage, and cries. She assumes the reversed arched position on the belly. The patient is contorted and rolls over several times.

(c) She now gets up on her knees, her visage expressing horror: "Traitor!—It is true. What is that which he comes here to do?" She becomes calm little by little, assumes a desolate air, laughs, lies down, sinks into her bed, and turns herself from one side to the other.

She sits down, balancing the arms and the head. Her expression is smiling; her gaze is fixed on high. "Oh! it is pretty; it flies away." Suddenly her features contract and breathe affright; her eyes are directed on high and to the right. She cries out with terror; she struggles; her eyes always fixed in the same direction. Just as promptly as she became frightened, the scene again becomes one of calmness and mirth. "Oh! it is pretty." She seems to follow with her gaze something that flies in the air. "The sportsmen must bring them down." She seeks her bed, scratches. "Oh! oh! it is droll, ah! ah!"

10.17. A new attack supervenes.

III.—(a) The epileptoid period presents the same characters as in the preceding attacks.

(b) Arched position with undulation of the belly. Great movements. Cries. Arched position again; the patient rests on the feet and head; then all at once she throws herself on her belly, in the reversed arched position. Cries, struggling, throwing herself from right to left.

(c) Attitude of terror; the patient is on her knees, inclined forwards; "Ah! all these monkeys!—Mamma—I do not wish any one to strike me.—(She struggles.) All these monkeys!—(Gesture of menace.) They wish to kill me. So much the better.—Oh! all this blood! well done."

10.22. Ovarian pressure brings back consciousness, which disappears as soon as this manœuvre ceases. Contrary to that which generally happens, she does not resume the attack from the beginning; she continues. A new emotional

position is reproduced; she is all admiration; she is on her bed, the hands joined: "Oh! how well they dance! They are light and graceful! One would say they are nymphs!" The attack is suspended by ovarian pressure. When the compression is stopped she retains consciousness; but soon a new attack comes on spontaneously.

IV.—(a) The epileptoid period (tonic and clonic phase, frothing) arrested in the middle of the clonic phase by ovarian pressure. The patient recovers her senses. Pressure on the mammary hyperæsthetic point provokes a new epileptoid period, which we are not able to arrest by a new excitation at the same point.

(b) Cries. Arched positions of several varieties. These different attitudes succeed each other abruptly, and only last a few seconds. Cries; movements of rolling. Rage, bites the pillow.

(c) 10.27. Attitude of terror; exclaims several times "Ah! ah!" with fear. Directly succeeds a gay attitude, which does not last long. "She is unfortunate! Poor woman! Finally, it is not true; they say meanwhile that it is true." She then declaims these verses of Alfred de Musset:—

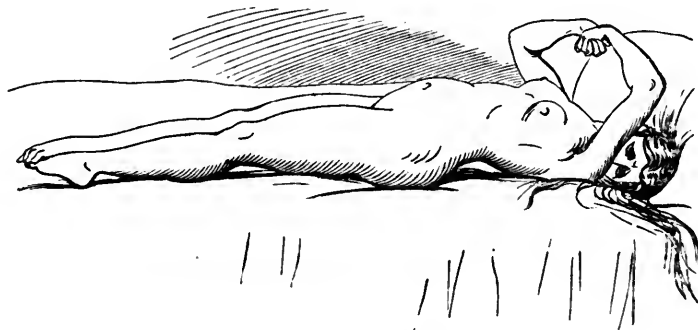
"Vous n'avez jamais vu le spectre de la Faim
Soulever en chantant les draps de votre couche,
Et, de sa lèvre blême effleurant votre bouche
Demander un baiser pour un morceau de pain."

"All these women there, how they mock the poor men! As for me, I will never mock them; no, never! One does not know how they came there. I have not the right to say anything, that would bring scorn on my own family. I am not the judge of the acts of my parents. The children must bear the consequences. I will be an actress. Certainly, I wish to make myself an actress. (She changes her mind.) No, hold, I will become religious. To adore the good God! I will die very young. I will see God—I will go to Heaven." She looks towards the right side of her bed. "I have a guardian angel, I see him! Oh! how beautiful he is!" She remains in contemplation, joins her hands and seems to recite some prayers, as her lips move lightly. Her expression is radiant; her eyes, wide open, are wet with tears. "I wish that he would speak to me—Oh! no, I will not become an actress."

Scarcely had she uttered this phrase when a new attack comes on; and so the series continues.

Richer devotes a large part of his book to unedited observations received from outside of Salpêtrière, and to others which he has laboriously collected from the annals of medical science.

Fig. 15.



In Fig. 15 we have a beautiful illustration of one of the positions assumed by a hystero-epileptic, from Dr. Allan McLane Hamilton's *Treatise on Nervous Diseases*.

The patient, æt. 18, represented in the figure had suffered from hystero-epileptic attacks since the beginning of the menstrual epoch. Usually she had several severe but distinct epileptic seizures, and afterwards a hystero-epileptic paroxysm. The muscles of her back were rigidly contracted in opisthotonos. Her arms were drawn over her chest, and her forearms slightly flexed and crossing each other. Her thumbs were bent in and covered by her other fingers, which were rigidly flexed. Her toes were also flexed, and her right foot presented the appearance called by Charcot "*le pied bot hystérique*," or hysterical club-foot.

Hystero-epilepsy in the male is very rare, but does occur. Richer records, from the practice of Charcot, a case of convulsive hysteria developed in a lad of twelve years.

I have tried to give a clear view of the regular or typical hystero-epileptic attack as described by the French authors. Hystero-epilepsy of imperfectly developed or irregular type is, however, even in France, a common affection. Varieties of grave hysteria must be studied, and they are best studied in the light of the knowledge of the great attack.

According to Charcot the attack of hystero-epilepsy can be modified according to two principal methods: 1st. By extension or predominance of one period at the expense of the others, which become lessened or even effaced, thus producing, *a*, the *epileptoid attack*; *b*, the *demoniacal attack*; *c*, the *attack of ecstasy*; *d*, the *attack of delirium*. 2d. By the blending of elements foreign to the fundamental constitution of the attack, such, for instance, as *somnambulism*, *lethargy*, and *cataplexy*.

I can scarcely do more than glance at the principal varieties of the grave hysterical attack.

When the varieties are the result of the predominance and modification of the first period, *epileptoid attacks* are produced. The last three periods are to a greater or less extent suppressed. Sometimes the epileptoid attack will be isolated like a paroxysm of true epilepsy. Sometimes attacks will succeed each other in rapid succession, constituting the *epileptoid states* (*état de mal épileptoïde*). Epileptoid varieties of the hystero-epileptic attack could, of course, be multiplied indefinitely. Richer contents himself with a study of four varieties: *a*. The *epileptoid status*, in which the tonic and clonic phases, and the phase of resolution and stertor occur, and these are repeated again and again for hours, days, and even weeks and months. Charcot speaks of a case in which this state actually persisted for two months. *b*. *Incomplete epileptoid fits*, which closely resemble the epileptic vertigo, which accompany certain rapid and localized muscular contractions. Herpin has well described these seizures under the name of epileptic commotions. A jerking or convulsive movement shakes the body like an electric shock; the trunk may be bent, the arms elevated, or the legs flexed, or a single limb or the face or head may be jerked. Sometimes the patients fall, more frequently they do not. Sometimes sight is

dimmed; intelligence and consciousness sometimes are and sometimes are not affected. A cry, dyspnœa, nausea, precordial pain, and palpitations, sometimes occur. To the above may be added such hysterical phenomena, as ovaralgia, strangulation, palpitations, whistlings in the ears, beatings in the temples, swelling of the neck, tympanites, borborygmi, etc. The epileptoid commotion may repeat itself in a series of seizures. *c. Attacks of visceral spasm.* Visceral spasm may be so great, as shown by hiccough, lifting of the chest, contraction of the muscles of the neck, and terribly irregular respiration, that the patient will appear to be dying; but ovarian compression interrupts the attack, and a little chloroform causes it to cease entirely. The appearance of great gravity is far from being real. *d. Epileptoid attacks with general and permanent contracture.* A limb or limbs, or the face may be violently contracted, with or without loss of consciousness. Ovarian pain, thoracic oppression, sensations of strangulation, palpitations, cyanosis of the face, etc., may be present. Sometimes the general contraction is accompanied by loss of consciousness and a lethargic sleep which may be prolonged for hours.

Attacks which have been well called *demoniacal* are sometimes produced by modifications of the contortions of the second period. Here are the wildest phenomena of movement, frightful contortions and contractions, with grimaces and cries of fury and rage. Ler—, one of the famous cases of Charcot, is a victim of these demoniacal attacks.

Sometimes, instead of the illogical positions and contortions being wildly exaggerated, the great movements of the second period show a violence beyond description, requiring half a dozen attendants perhaps, to prevent the patient from injuring herself.

Modifications of the period of emotional attitudes, with partial or complete suppression of the other periods, produce attacks of ecstasy. Ecstasy may be found outside of hysterical attacks; but a hysterical ecstasy is observed which is simply a modification of this period.

Attacks of delirium may stand alone as the representative of the hystero-epileptic attack. Sometimes these attacks accompany phenomena which belong to the other periods of the grave hysterical attack; sometimes they show themselves independently of all other hysterical phenomena.

It was found by Charcot and his associates and assistants, that many of the hystero-epileptics under various influences, such as a bright light, sonorous vibrations, fixity of gaze, compression of the eyeballs, and passes, were susceptible of entering into states of catalepsy, suggestion or imitation, lethargy, and somnambulism.

Some curious and interesting varieties of hystero-epilepsy result from the blending of the phenomena of lethargy with some of the hysterical manifestations already described. Numerous instances of simple lethargy or prolonged sleep in hysterical cases are on record. Landouzy has reported an interesting instance of lethargy produced by the application of a mag-

net to a patient suffering from hysteria major. The attacks of hysterical sleep are often preceded by convulsive phenomena; and, according to Briquet, are often ushered in by epileptoid signs, such as whistling inspiration, movements of deglutition, frothing, and transient rigidity of the limbs. Richer reports a remarkable case of Pfendler's of Vienna, in which a young girl, after a series of violent hysterical attacks, fell apparently dead. Preparations were made to bury her, when she was found to be living, having been in a state of lethargy. Among cases observed in Salpêtrière the duration of lethargy has been from two to eight days. Sometimes in cases of grave hysteria attacks of lethargy complicated with general or partial contractures and epileptoid phenomena have been observed. The presence of neuro-muscular hyperexcitability is of diagnostic value in determining the nature of such cases; if present we have probably to deal with the phenomena of hysterical lethargy. This symptom may, of course, pass unperceived.

In hystero-epilepsy attacks of lethargy are sometimes complicated with cataleptiform phenomena. The eyes are shut, the lids winking; partial contracture or general rigidity comes on; the limb keeps the position in which it is placed, although sometimes it is necessary to hold it a few moments before abandoning it to itself.

The catalepsy is often partial. Frictions restore muscular resolution. The condition is not one of true catalepsy, but of the cataleptiform state of lethargy.

Sometimes, again, varieties of hystero-epilepsy are produced by the admixture of the phenomena of catalepsy or somnambulism. It is not necessary to believe in the absolute identity of the nature of catalepsy and hysteria. It seems rational to admit, according to Richer, that we may have a hystero-catalepsy without true epilepsy, just as hystero-epilepsy may contain nothing of true epilepsy. Catalepsy and somnambulism in cases of hystero-epilepsy are sometimes complicated with emotional attitudes; sometimes they are accompanied by phenomena pertaining to different periods of the hystero-epileptic attack; sometimes they appear under the form of distinct seizures in a patient who, at other times, has convulsive attacks, or simply other signs of hysteria. Many remarkable cases illustrating these statements are put on record by Richer.

Between the delirium of grave hysteria and the cerebral affections caused by the absorption of various toxic substances, such as alcohol, absinthe, and haschisch, striking analogies have been discovered.

Besides the great attacks and their numerous varieties, grave hysteria counts among its manifestations phenomena which merit the name of permanent symptoms. The most striking of these are the troubles of sensibility, such as anæsthesia, hyperæsthesia, etc., the affections of motility, such as paralysis, contracture, common chorea, and rhythmical chorea. They also comprise disorders of secretion, such as anuria, vomiting, and

hæmatidrosis; troubles of nutrition, such as result from prolonged abstinence; and disturbances of circulation, such as flushings, urticaria, stigmata or ecchymoses, etc.

The presence of anæsthesia in cases of hysteria has been well known for many years. In hystero-epilepsy anæsthesia is the rule. It is distributed irregularly over the surface of the body; sometimes limited to a point of the trunk or to a limb; most frequently in grave hysteria it occupies one-half of the body (hemianæsthesia). It may extend over the entire skin. Sometimes we have simply *analgesia*, which is the first degree of loss of sensibility, in which the sensation of pinching or pricking is perceived, but is not painful. The anæsthesia at times extends to the muscles and even to the bones. Many hysterical patients are anæsthetic without knowing it. Charcot has particularly drawn attention to hysterical hemianæsthesia. The head, the limbs, and the trunk of one side are all affected. All the modes of common sensibility, to touch, pain, and temperature, and all the organs of sense, of sight, hearing, smell, and taste, are affected. The hemianæsthesia is always accompanied by some muscular enfeeblement. It more often has its seat on the left side, which is most frequently the seat of ovarian hyperæsthesia.

Hysterical hemianæsthesia is habitually accompanied by general or partial achromatopsia, a form of colour-blindness. Hysterical achromatopsia differs from Daltonism. The patient suffering from Daltonism will take one colour for another; but in hysterical achromatopsia the notion of colour is lost completely. The colours disappear always in a known order from the centre to the periphery of the field. The visual field, it is well known, is physiologically more extended for some colours than for others.

Hysterical anæsthesia undergoes spontaneously certain variations in intensity. This anæsthesia and most of the permanent symptoms of hystero-epilepsy are also readily modified by certain agents called *æsthesiogenic agents*, which act on the surface of the body. Among these are applications of metallic plates, subcutaneous injections of metallic salts, and various electric applications. M. Vigouroux considers static electricity as the most powerful of all æsthesiogenic agents. Galvanic and faradic currents, bar magnets, electro-magnets, solenoids, vibrations of sonorous bodies, ice, cold and hot water, sinapisms, blisters, etc., all have been proved to have æsthesiogenic qualities. The hysterical anæsthesia will disappear momentarily under the influence of that æsthesiogenic agent to which the patient is susceptible, which is found by trial. When the sensibility returns on one side, it often disappears in the same region of the opposite side. This is the phenomenon of *transfer*. Sometimes anæsthesia returns to the first side, again disappearing on the other, and this is repeated again and again, constituting what Charcot has called *consecutive oscillation*.

The æsthesiogenic agents act on special sensibility in the same fashion

as on general sensibility. Under their influence the organs of special sense recover their functions, and the phenomena of transfer and consecutive oscillations take place.

The return of sensibility which is usually momentary can be rendered permanent by maintaining in contact with the skin which has been rendered sensitive a plate of metal which is neutral, that is, which is incapable of producing in this case metalloscopic phenomena (Vigouroux).

In a patient not actually anæsthetic, but in whom the hysterical diathesis exists, anæsthesia can be produced by various applications, thus giving a diagnostic and prognostic value to these æsthesiogenic agents.

Hysterical patients in general become refractory to the æsthesiogenic applications just before and after a crisis, and sometimes when affected by strong emotions. Occasionally they cease to be impressionable to their usual metal, but become sensible to others. Hysterical anæsthesia is probably of cerebral origin.

Marked enfeeblement of muscular power very constantly accompanies the anæsthesia of the limbs in cases of hystero-epilepsy. Hysterical hemiplegia or hemiparesis is very common. It is three times more frequent upon the left side than upon the right.

Paralysis is five times more frequent in the lower than in the upper limbs. It very rarely attacks the muscles of the face. (Briquet and Landouzy.) The paralysis may affect the constrictor muscles of the pharynx and œsophagus, the muscles of the larynx, of the bladder and rectum.

Hysterical hemiplegia enters into the category designated by Brissaud under the name of hemiplegia with latent contracture.

Exaggeration of tendon reflexes is a frequent phenomenon in hysteria.

Contracture, partial or general, as has been shown, is often met with before, during, or after the hystero-epileptic attack. Permanent hysterical contracture is, however, more properly a symptom of non-convulsive hysteria. It has been well studied by Charcot, Bourneville, and Voulet.

In hysterical patients these contractures can be brought on by a variety of methods, as by mechanical excitation of muscles, by the branches of a tuning-fork, put in vibration and made to traverse the skin; by strong tractions on a paretic limb; by a violent muscular effort on the part of the patient; by local faradization; by the applications of magnets; by traumatisms. Hysterical contracture is due to a special dynamic modification of medullary centres.

Among the hysterical affections of motility hysterical rhythmical chorea is one of the most interesting. In this form of chorea the involuntary movements are systematized into a certain order, so as to produce in the parts of the body which are affected determinate movements which always repeat themselves with the same characters. The movements which are seen in these isolated cases, a number of which have been reported, are

strikingly analogous to the rhythmical movements, as those of "salutation," which often occur in the second period of the hystero-epileptic attack. Rhythmical chorea should undoubtedly be ranged among the manifestations of grave hysteria. An account of an interesting case of this kind is given in a lecture by Professor H. C. Wood, reported by me in the *Philadelphia Medical Times* for February 26, 1881.

Hystero-epileptics are often suspected of simulation. Richer refers to many facts which seem to throw out conclusively the idea of simulation. Among these are the results obtained by the æsthesiogenic agents, the experiments in hypnotism, where many of the results produced could not be simulated.

Some English authors, and among them notably the physiologist Carpenter, have endeavoured to find the explanation of the results obtained by the æsthesiogenic agents in a special action of the moral on the physical nature which they designate "expectant attention." While the reality of the action of expectant attention in certain cases will not be denied, it cannot be invoked to explain satisfactorily all the phenomena. The patients are not aware of the results sought, which, indeed, in some cases are contrary to the expectations of the observer himself.

Richer gives a summary of the diagnostic signs between true hystero-epilepsy and true epilepsy.

(a) Arrest of the attacks by ovarian compression, by the application of inverted electric currents, and by irritation of the hysterogenic zones, can be brought about in hystero-epilepsy and not in epilepsy.

(b) The course of the temperature in the epileptic state and in the hystero-epileptic state differs. This point of capital importance has been indicated by Charcot and Bourneville. An elevated temperature, of 40° C. (104° F.) or more, belongs to the epileptic state; while in hystero-epilepsy the temperature remains nearly normal, and only under exceptional circumstances passes above 38° C. ($100\frac{2}{3}^{\circ}$ F.).

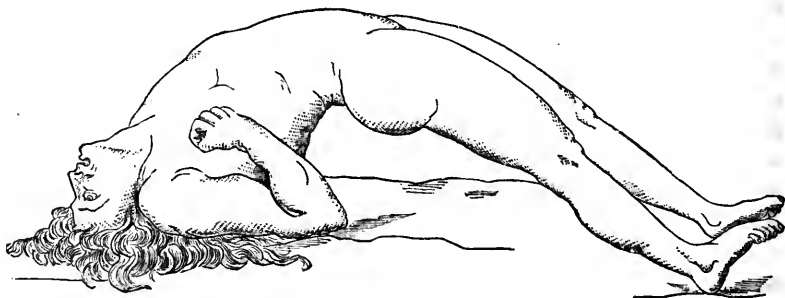
(c) The mode of action of potassium bromide, a drug frequently used in both affections, favours the opinion that the two diseases are distinct. Potassium bromide, so salutary in epilepsy, is without efficacy in hystero-epilepsy.

The service of Charcot at Salpêtrière contains a number of types of epileptic insanity truly startling. These form a strong contrast to the "veterans" of hystero-epilepsy.

The hysterical or hystero-epileptic contortion need not be confounded with the opisthotonos of tetanus. In Fig. 16 is a representation of the opisthotonos of tetanus taken from Sir Charles Bell's *Anatomy and Physiology of Expression as connected with the Fine Arts*. It is a sketch of a soldier, struck with opisthotonos after having been wounded in the head, in connection with which I will briefly call attention to the points of differential diagnosis as given by Richer, and which have been confirmed by

my own observations. In the opisthotonos of tetanus, the contraction of the face, and the peculiar grin, are distinguishing points, and are well represented in Bell's sketch. In the hysterical arched position, while the jaws may be strongly forced together, the features are most often without expression. The contracture of the face and the distortion of the features will be met with more often in the other varieties of contortion. The curvature of the trunk differs but little in the two cases, but the abdominal depression, observed in the sketch of Bell, is far removed from the tympanites present in the majority of the hystero-epileptics. In the tetanic cases, the patients rest only on the heels, while in the hysterical cases the knees are slightly flexed, and the patients are usually supported on the bed by the soles of the feet.

Fig. 16.



The general health of hystero-epileptics does not appear to suffer. The grave attack, even the long series of attacks, often leave only a state of insignificant lassitude, not at all in relation with the immense expenditure of muscular force. The duration of the affection may be very long, commencing before the epoch of menstruation and prolonging itself long after the menopause. They remain always in about the same mental condition. Except the whimsical frame of mind well known to belong to the hysterical temperament, the intellect does not undergo any notable alteration.

The prognosis of hystero-epilepsy is far from being as grave as that of epilepsy, a fact which makes still clearer the distinction between the two diseases.

Esquirol, Morel, Reynolds, and every one who has written about epilepsy, or had any experience with it, is fully aware of the permanent intellectual troubles which develop among epileptics.

Richer discusses the treatment of hystero-epilepsy under the two heads of (1) the treatment of the attacks; and (2) the treatment of the disease.

Inhalations of chloroform, sometimes inhalations of ether, and the subcutaneous injections of the chlorohydrate of morphia will make the convulsions cease, bring on resolution, and plunge the patient into a sleep, followed often by a special delirium. At *La Salpêtrière*, Bourneville studied on a vast scale the action of nitrite of amyl on the attacks. The convulsions

are immediately stopped, and, more than this, the use of the drug diminishes the number of the fits.

Applications of ice on the ovarian region are impracticable during the attack, but employed during the prodromes, they diminish their intensity, and delay or even banish completely the convulsions. The ice, above all, acts best on the visceral spasms, hiccoughs, movements of the belly, etc., which torment the hysterics in the intervals of the attacks.

The continuous or galvanic current has been employed to arrest the attacks. Richer speaks of two methods employed with success by himself and Regnard, in the service of Charcot. (1) The patient being in the attack, one rheophore is applied by means of bands to the forehead, the other anywhere upon the body, a leg or the ovarian region being often selected. From five to ten or fifteen elements of the apparatus of Trouve are used. The current is passed in either direction continuously. It diminishes the violence of the attacks, and during the hystero-epileptic status puts off the return of the fits. (2) The electrodes being disposed as above described, the operator waits until an attack comes on, and then inverts the current by means of a commutator. The attack is at once arrested. The patient awakens astonished, carries her hand to the head, and completely regains consciousness. In the worst cases it may be necessary to repeat the inversions two or three times to bring about the result. Richer and Regnard usually employed forty or fifty elements of the apparatus of Trouve; evidently, I should say, an apparatus with weaker elements than those commonly employed in this country. Forty elements might be dangerous if applied to the head in this way.

Compression of the ovary on the side of the seat of the lesion ordinarily will immediately arrest the convulsions. Charcot has restored this method of treatment of hysterical attacks. The patient is extended horizontally, and the physician plunges the closed fist into the iliac fossa, often using great force to overcome the muscular resistance.

Poiner has invented an apparatus called a "compressor of the ovaries," which can sometimes be used with advantage.

Under the influence of sonorous vibrations, as from a diapason or gong, attacks of catalepsy, or even the grave hysterical attack, have been known to supervene. Richer gives some interesting historical notes on the utilization of music in medicine from the time of Pythagoras to the present. Among the hystero-epileptics sonorous vibrations were found to be without result during the great attacks, even among those who were easily impressed outside of the crisis. This simply proves that the general anæsthesia during the fit extends also to special sensibility. The influence of music on the hysterical seizures limits itself to the convulsive attacks without loss of consciousness, and to those varieties in which special sensibility sometimes persists, as in catalepsy, lethargy, and somnambulism.

When we come to consider the treatment of the disease hystero-epi-

lepsy, the practical importance of the distinction between this affection and true epilepsy becomes at once apparent. Cures of hystero-epilepsy are not rare. The original cases here reported have both, to all appearances, recovered. Grave hysteria is sometimes cured spontaneously, either by gradual disappearance with the progress of age, or suddenly, because of some violent impression, or under the influence of unknown causes. One of the worst cases in the service of Charcot has shown a gradual diminution of the hystero-epileptic manifestations with the advance of age. In another case, under the influence of strong moral impression, the disease disappeared at a stroke. The affection, however, should not be abandoned to nature, as treatment is often of great value.

I will give some of the most successful methods of treatment adopted in France.

The hydrotherapeutic method of treatment has been found of the greatest service. In carrying it out in private practice the patient should be separated as far as possible from her habitual surroundings and advisers, above all from her parents and family, whose over-solicitude often keeps up the conditions which they seek to combat. This can be best accomplished by placing the patient in a hydrotherapeutic establishment. Hydrotherapy must be methodically employed by experienced hands. A number of the cases cited by Richer were cured at hydrotherapeutic institutions.

Limited success has followed the use of metallotherapy, the method introduced by Burq, and which became widely known to the profession through the lectures of Charcot. In brief, this method of treatment is as follows: After having determined by a series of experiments the metal to which the patient is sensitive, plates of this metal may be applied to the surface of the body, which constitutes *external* metallotherapy; or the metal in the form of powder (as reduced iron), or an oxide or salt of the metal, may be administered, this method being known as *internal* metallotherapy. Curative effects have been obtained in this way. One of the patients reported by Richer was cured by the gold treatment.

Besides metallic plates the same results may be obtained with other physical agents, to which, as we have seen, have been given the name of *æsthesiogenic* agents. Among these are feeble electric currents, vibrations of a tuning-fork, magnets, static electricity, etc.

A feeble current from a constant or galvanic battery applied to the hysterogenic regions, or even to other parts of the body, will sometimes prove of great service.

Charcot and Vigouroux cured one case affected with hysterical contractures of the left arm by repeated applications of a magnet to the right or healthy arm. Debove, by prolonged bilateral applications of magnets, has obtained success in the hemianæsthesias and hemiplegias which accompany cutaneous anæsthesia, when the nervous troubles depend on

hysteria, alcoholism, saturnism, or various cerebral lesions. Dr. Carlo Maggiorani, Professor in the University at Rome, in two works, one published at Milan in 1869, and the other a few years later, studied the physiological action of the magnet, and laid down the first rules for its employment in therapeutics.

Static electricity has recently been again brought into prominence in the treatment of grave hysteria, chiefly through the labours of Dr. Romain Vigouroux who has special charge of electrotherapy in the clinical laboratory of Charcot at Salpêtrière. Vigouroux ranks static electricity among the æsthesiogenic agents, and believes that it possesses a greater power than metallic plates and other æsthesiogenic agents in general.

With reference to drugs, I will simply say that we should resort to those which have a tonic influence upon the nervous system. Potassium bromide, as has already been indicated, is not efficacious. More is to be hoped for from tonics and antispasmodics, such as valerian, iron, salts of silver, zinc, copper, sodium and gold chloride, etc. Good hygienic influences, moral, mental, and physical, are of the utmost importance.

Hystero-epilepsy undoubtedly played a great part in the great convulsive epidemics which desolated the middle ages. Calmeil, Littré, Valentiner, Charcot, Richer, and others, have shown conclusively the analogies which exist between the ancient convulsive epidemics—the epidemic chorea of the middle ages, the epidemics of demoniacal possession, the convulsionnaires, and the ecstasies—and the hystero-epilepsy of the present day.

ARTICLE VII.

THE TREATMENT OF SCARS OF THE FACE INVOLVING THE EYELIDS DIRECTLY OR INDIRECTLY.¹ By CHARLES STEDMAN BULL, A.M., M.D., Lecturer on Ophthalmology and Otology in the Bellevue Hospital Medical College; Surgeon to the New York Eye and Ear Infirmary; Ophthalmic Surgeon to St. Mary's Free Hospital for Children, and to the Nursery and Child's Hospital.

SCARS upon the face, in the vicinity of or directly involving the eyelids, have long been a subject of interest to ophthalmic surgeons; and various have been the attempts to remedy the defects produced by the contraction subsequently occurring in them. The main interest has apparently centred in those scars, more or less extensive, due to burns or to extensive laceration and destruction of soft parts from wounds, chiefly gunshot, like those received in battle. The same or an equal degree of interest does not seem to have been attached to those depressed scars due to long-continued glandular abscesses, or to chronic bone-disease with subsequent

¹ Read before the American Ophthalmological Society, Newport, July, 1881.

exfoliation of bone. The object to be gained by operative interference in these cases is twofold, viz., to remedy an unpleasant deformity, and to protect the eye from injury by restoration of one or both eyelids, in whole or in part. Whether the case be one of partial or complete ectropium of one or both lids, caused by the cicatrization following a burn, or of partial or complete destruction of one or both lids, the operation deemed necessary is some form of blepharoplasty, either by sliding flaps or the transplantation of a flap with pedicle from some neighbouring region, or by the process of grafting without pedicle by the transplantation of skin, in numerous small pieces or in one large graft, from some distant region. All of these various operations occasionally fail in their ultimate results, and this from no fault in their technical performance. No surgeon, however experienced, in his desire to correct a deformity, can ever trust implicitly in the persistence of a large scar, and he should be very cautious in attempting to remove the effects of contracting bands of tissue by operation, for every new incision that is made is eventually filled up by the formation of this same granulation tissue, in which the same contracting process goes on as in the original scar. The new-formed granulation tissue is gradually changed into fibrous connective tissue, and then becomes true cicatricial tissue, made up of bundles of connective-tissue fibres, as are seen in tendons and fibrous membranes. This conversion of the exudation cells of granulation tissue into filaments of cicatricial tissue, ending in contraction, seems to be very much of a mechanical process. We all recognize the fact that the changes taking place in a cicatrix do not cease with its formation, for the gradual contraction continues for a considerable, though very variable, period of time, and does not attain its maximum until long after the completion of the cicatrization. In view of these facts it has seemed to the writer that operations for blepharoplasty are sometimes undertaken too early, before cicatricial contraction has ceased, and that in some of the cases at least, the lack of ultimate success may be thus explained. Another point to be remembered is that the contraction in scars from burns is greater than from any other cause, and the contracting process lasts longer. Still another point to be remembered is that the degree of contraction, though largely dependent on the nature of the agent that caused it and upon the extent of its destructive action, also depends somewhat upon the seat of the scar. If it is in a region where the skin is naturally tense, as over bony prominences, the contraction will be slighter than where the skin is naturally loose. A scar over the superior orbital margin, or on the side of the nose, or over the zygoma, will contract less than one over the lower orbital margin or on the cheek. But on the other hand, in injuries or burns of those regions where the skin is naturally tense, the resulting cicatrix is in most cases immovable, in this regard being almost characteristic. In superficial caries with an external opening, when the bone-disease is arrested and the necrosed por-

tions have been detached and cast off, repair goes on in the usual way by the formation of granulation tissue, which is subsequently converted into fibrous tissue, becomes continuous with the bone or periosteum at the seat of the original disease, contracts and possibly ossifies, and thus the depressed cicatrix is caused. This is well described by Dr. D. Hayes Agnew in his late work on "Surgery."

We should not be too hasty in operating for deformities about the lids produced by the scars resulting from bone disease. For very often these scars break down from pressure or tension, or from some constitutional cause such as struma, or alcoholism, or scurvy. Such spurious cicatrization is not infrequently seen over fistulous openings from bone caries; the surface of the scar retains a pale blue hue sometimes for a long period, and conceals a granulating tissue below. Such scars never attain the vitality of older structures, and the larger they are, the less vitality as a rule do they possess. Any operative procedure to relieve the deformity accompanying such a scar would be almost certain to fail, whether by blepharoplasty with sliding flaps or with a pedicle, or by grafting without a pedicle. Excision of the entire scar, and if bone disease be present, removal of the affected portion by forceps and scraper or chisel, must precede any successful attempt at blepharoplasty, if a solid cicatrization is to be obtained.

Certain observations of the writer upon the natural course of development and transformation in scars of the face involving the lids, directly or indirectly, have led him to think that the natural process of change may be assisted and perhaps hastened by a combination of massage and traction, and thus the parts made more movable and put into a better condition for the performance of any blepharoplastic operation, the chances of the success of which are thereby enhanced. We know that in time the tissue of a scar assimilates more and more to the structure of a part, and its deep attachments become more movable. The scar which at first is thin, bluish and shining, and composed of undeveloped fibrous tissue, becomes white and depressed, and its structure comes very slowly to resemble that of the part where it is situated, though of course it never becomes true skin. The loosening of such scars from their deep attachments is due to a slow absorption of certain tissue elements and the formation of a loose network of connective tissue, more or less elastic and pliable, at the base of the scar. Great changes occur in this regard in course of time, but as Hayes Agnew says, external agents such as rubbing and kneading the parts, or massage, and even soaking and steaming the parts, are useful in hastening the process of interstitial absorption. We can readily see that the act of massage, by pressure on plastic deposits, causes an absorption of a certain amount of intercellular material, and thus the texture at the base becomes more open. Persistent rubbing and kneading of scars of the face, both those due to burns and those resulting

from bone caries, as preparatory to blepharoplasty, have in a number of instances in the writer's experience yielded most excellent results. Adhesions of scars, slight or extensive, to the subjacent parts, have been slowly, cautiously, and painlessly detached, and a gradual absorption of the firm material in the dense part of the scar has been brought about. So considerable has been the result obtained in some cases, that the writer has come to regard this gradual extension and loosening as an important part of the treatment in these cases. It is astonishing how soft and pliable the seams in these scars become under this treatment, and this pliability and elongation of the cicatrix are probably permanent.

The depressed scars due to bone disease, in which, after the casting off of the sequestrum, the fistulous sinus has closed, and the scar has become depressed and firmly adherent to the bone or periosteum, generally prove intractable to this method of treatment by massage. In these cases it will be necessary to divide the adhesions subcutaneously and then keep up motion in the parts by rubbing, until all danger of re-adhesion of the old attachments has passed. This operation has been advocated by Mr. Wm. Adams of England, who has practised it in a number of cases with success (see *British Medical Journal*, April 29, 1876). He describes it as an operation for the obliteration of depressed scars after glandular abscesses or exfoliation of bone. The operation consists first in subcutaneously dividing all the deep adhesions of the cicatrix by a tenotomy knife, introduced in healthy tissue a little beyond the margin of the cicatrix and carried down to its base. Then the depressed cicatrix is carefully and thoroughly elevated, lifting it up as it were so that the cicatricial tissue remains prominently raised, and the cicatrix maintained in its elevated position for several days by passing two hare-lip pins or stout needles through the base at right angles to each other. The needles or pins are generally removed on the fourth day, and the cicatricial tissue, somewhat swollen and infiltrated, is allowed gradually to subside to the proper level of the surrounding skin. Adams thought that after subcutaneously dividing all the deep adhesions of the cicatrix, elevating the cicatricial tissue and retaining it so raised for a few days, the depression would become filled up by inflammatory infiltration, so that the scar could not again sink below the level of the surrounding skin, the depression would thus become obliterated and all the adhesions of the cicatrix would be effectually removed. The doubtful point is whether, in the course of time, absorption and recontraction of the inflammatory lymph would take place, so that the depression would return. After the operation the cicatricial tissue always loses its shiny membranous character, and becomes looser and of an opaque white colour.

So far this method of treatment of depressed, adherent scars from bone-caries has been employed by the writer in but three cases, but in all with satisfactory success.

One was for complete eversion of the lower lid by a broad depressed cicatrix firmly adherent to the superior maxilla below the orbital margin. The original trouble was probably extensive caries of the bone from scrofulous disease. After the loosening of the scar had been effected, and subsequent massage treatment had been carried on for four weeks, the lid was inverted, and the space opened by the incision along the line of the scar through healthy tissue was filled in the ordinary way by transplantation of a flap of skin with pedicle from the temple.

The second case was also one of complete eversion of the lower lid from the same cause, the original injury having been a pistol-shot wound. The adhesions here were not so broad as in the first case. The subsequent method of treatment was the same.

The third case was one of almost complete eversion of the upper lid, produced by a long and somewhat broad scar on the forehead, just above the eyebrow, the cicatrix being markedly depressed and firmly adherent throughout its whole length to the bone. There had been quite extensive destruction of bone from a severe blow received many years before. In this case also the same steps were carried out, and the resulting gap from the incision filled by transplantation of a flap from high up on the forehead. As before stated, the ultimate result was excellent in all the cases.

ARTICLE VIII.

SUPPLEMENT TO A CASE OF PAINFUL NEUROMA OF THE SKIN. By LOUIS A. DUHRING, M.D., Professor of Skin Diseases in the Hospital of the University of Pennsylvania.

In the number for October, 1873, of the *American Journal of the Medical Sciences*, I described a remarkable case of painful neuroma of the skin. The patient at that time had already been under my observation six years. A drawing showing the cutaneous lesions and their distribution accompanied this article, which, together with the letter-press, gave a satisfactory idea of the disease. It was there remarked that the case was probably unique. Its resemblance to the better-known painful subcutaneous tubercle, originally described by Wood, of Edinburgh, was also alluded to; but it was shown to differ from this formation in important particulars. Shortly after this date, a case of painful neuroma of the skin was reported by Kosinski, which appears to have been almost identical in its general features with that under consideration, an abstract of which may be found in my "Treatise on Diseases of the Skin." I am not aware of any like case having been since reported.

In the July number of this Journal for 1874, there appeared a further

report of this case, including an account of the exsection of a portion of the brachial plexus of nerves, performed by the late Dr. F. F. Maury, for the relief of the excruciating pain which the patient suffered. It will be recalled that the result of the operation was, at the date of the last published note, tolerably satisfactory, the pain having been greatly relieved. These notes were dated four or five months after the operation. Subsequently, however—within a year—the pain became more violent, and two years later existed as severely as before the exsection. Since this date, up to the time of death, no marked change occurred.

The patient died in the ward for skin diseases of the Philadelphia Hospital February 16, 1880, six and a half years after the operation, having been under my observation about thirteen years. There remains but little to record from the last published notes to the time of death. A few small tubercles appeared on the back, but they did not attain the usual dimensions. The paralysis and the general atrophy of the limb remained unchanged. Death seemed to be the result of senile debility, the patient being in his eighty-third year. Notwithstanding the many years of great suffering, he continued in good general health until a month prior to his decease. Observations made a few days before death showed the area of hyperæsthesia to be the same as that recorded in the last report. The disease of the skin was everywhere exceedingly painful to the touch, while the whole limb was also the seat of spontaneous pain. Even during the last day the paroxysms of pain continued severe, causing him to cry aloud. Large doses of morphia did not materially lessen the suffering.

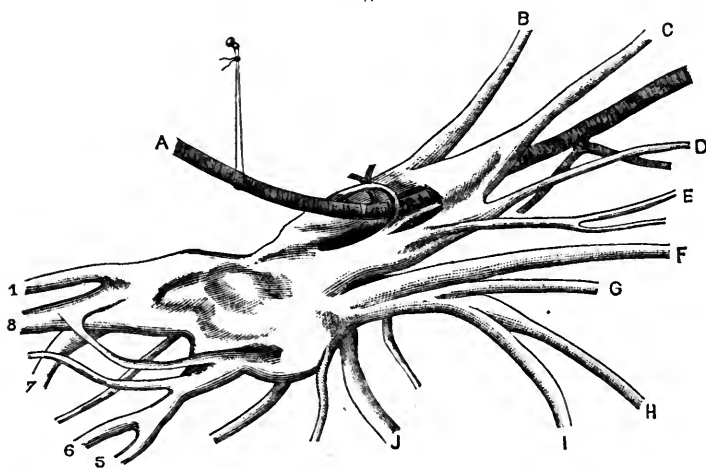
The *autopsy* was made by Dr. H. C. Boenning, house surgeon, thirty hours after death. There was complete absence of rigor mortis. The body was in a fair state of nutrition. The cicatrix over the left brachial plexus, situated one inch above the superior line of the clavicle at its middle third, was not adherent to the subjacent tissues, moving readily with the skin. The internal organs were for the most part normal. The brain was normal in appearance; the vessels at the base were the seat of atheromatous changes. The spinal cord was normal, as were also the membranes of the cord and of the brain.

The left (diseased) arm was semi-flexed, and seemed to be held thus by fibrous adhesions within the elbow-joint, slight motion only being possible. The shoulder-joint moved freely. The fingers of the left hand were flexed and distorted, and the nails were long and bent towards the palm. The skin of the anterior portion of the chest, from the median line of the sternum to the summit of the shoulder, and from the lower edge of the major pectoral muscle to the clavicle, of the outer aspect of the whole arm, and of the left scapular region, was the seat of discrete and confluent flat and raised tubercles, and in places of a diffuse tubercular infiltration, the lesions being most abundant over the outer aspect of the arm. The skin covering the forearm and hand was unusually thin, and was without sign of new growth. The deeper structures were laden with fat, which was infiltrated freely between the muscles, nerves, and vessels. Fatty degeneration and atrophy of the muscular tissue was marked.

I am further indebted to Dr. Boenning for a delicate dissection of the

nerves of the limb, as a result of which no connection between any of the nerve trunks or filaments and the tubercles was established; nor were any new growths found in the subcutaneous or deeper structures. The disease, therefore, was strictly cutaneous. The nerve-trunks were distributed normally. The brachial plexus of nerves was carefully dissected, when it was found that the cut ends of the nerves had united. A large ovoidal, whitish mass of firm tissue, one and a half inches in length, one-half inch in thickness, and one and an eighth inches in width, constituted the con-

Fig. 1.



The drawing (one-half natural size) represents the posterior or lower surface of the specimen. The nerves are drawn apart for the purpose of demonstration. The roots of the spinal nerves are indicated by figures 5, 6, 7, 8, 1, representing 5th, 6th, 7th, 8th cervical and 1st dorsal nerves. A, subclavian artery. Nerves: B, internal cutaneous; C, musculo-spiral; D, ulnar; E, circumflex; F, median; G, ?; H, I, musculo-cutaneous; J, supra-scapular.

necting band between the divided ends of the plexus. The formation was remarkably stout and strong. Its general form will be seen in the accompanying drawing, made by Dr. Boenning. The fifth and sixth nerves entered the mass as one trunk; the seventh alone, and on the upper surface. The lower two nerves, the eighth cervical and first dorsal, united to form a common trunk before entering the mass, or cicatrix, as it may be termed. From the lower end of the band there emerged three cords, which lower down divided into the various nerves of the arm. The nerves below the cicatrix were all more or less swollen and softened.

The nature of the cicatricial bond of union has recently been carefully studied by my friend Dr. George de Schweinitz, whose report is as follows:—

“Microscopical Report on the Cicatrix after Division of Brachial Plexus.—A square piece was taken from the centre of the cicatricial mass, between the entrance of the 5th, 6th, and 7th cervical nerves, and the exit of outer cord of the plexus. The specimen having been for some time in alcohol, no further hardening was necessary, and the excised portion was immediately imbedded in wax, and vertical and horizontal cuts made and examined after having been stained with carmine.

“Peripherally the mass is made up of various interlacing bands and

bundles of areolar tissue (white fibrous), sometimes well felted together and again forming a texture of looser consistence. In this connective tissue bed there are a few rows of fat cells, and here and there bloodvessels in cross-section. More centrally there are numerous bundles of nerve fibres, surrounded by their perineural and epineural connective tissue investments. Many of the bundles are composed of well-formed normal medullated nerve fibres, exhibiting axis-cylinder, medulla, and Schwann's sheath, the whole presenting a picture similar to what is seen upon making a cross-section of an ordinary spinal nerve. In some places, instead of a number of nerve bundles, a single fasciculus is seen surrounded by a mass of connective tissue. In other portions of the sections, the nerve fibres are not well formed, being either granular and degenerated or lacking in their full development into axis-cylinder, medulla, and sheath.

"Examination of many specimens shows that there has been abundant regeneration of the divided nerves and the formation of normal nerve tissue."

It will be remembered that in the examination of the cutaneous tubercles as reported in the first account of the disease no nerve structures could be demonstrated, and that, therefore, the diagnosis of neuroma of the skin rested upon clinical grounds. It was, moreover, believed at this time that the failure to prove the nervous structure of the growth was due to faulty handling of the specimen. Several years later a tubercle was excised and examined, and the presence of nerve fibres demonstrated, an observation which was recorded in the first edition of my "Treatise on Skin Diseases," p. 506. With the death of the patient ample opportunity was afforded for the examination of the growth, portions of which were excised for microscopic study. The specimens were entrusted to the care of my friend Dr. Henry F. Formad, whose reputation as a skilful microscopist is well known. The report of the examination, made by Dr. Formad's pupil Dr. George de Schweinitz, is so full of interest that I shall present it verbatim.¹

"*Microscopical Report of Prof. Duhring's Case of Neuroma Cutis.*—In the early part of this month specimens of this growth, together with some of the muscular tissue from the forearm, were sent to the laboratory of Dr. Henry F. Formad by Prof. Duhring. Portions of the excised tubercles were immediately placed in alcohol and hardened for section.

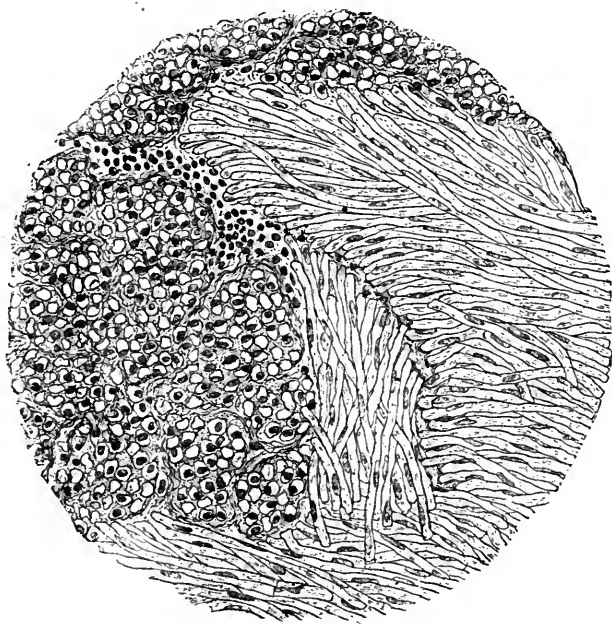
"Portions of the growth were also macerated in dilute hydrochloric and acetic acid and subsequently teased and examined in glycerine. Many sections were first placed in a solution of glacial acetic acid (5 to 15 per cent.), and these washed and stained with carmine. Small portions of the growth, unhardened by alcohol, were placed in lime and baryta water and allowed to remain from forty-eight to seventy-two hours, and then teased and examined in glycerine. The staining fluids used were: carmine, hæmatoxylin, indigo, carmine, chloride of gold ($\frac{1}{2}$ per cent.), and osmic acid ($\frac{1}{10}$ to 1 per cent.).

"Numerous transverse and vertical cuts, together with teased preparations, were made and examined by the methods above described. The

¹ The description is extracted from an admirable inaugural thesis from the pen of Dr. de Schweinitz on "Painful Tumours, with special reference to Neuromata," presented for the degree of Doctor of Medicine in the University of Pennsylvania, 1881.

growth consists essentially of the elements of the skin, densely packed connective tissue, and non-medullated nerve fibres. A typical section shows a connective tissue stroma, interwoven with the elements of the new-formation. The elements consist of fibres of various length and direction, but for the most part lying parallel with one another, each fibre being composed of a finely granular central substance, surrounded by a sheath, containing numerous elongated, oval, somewhat granular nuclei. In other words, it exhibits the elements of amyelinic or non-medullated nerves and the components of a true neuroma. In addition there may be seen yellow elastic tissue, bloodvessels with thickened walls which contain numerous nuclei, and finally, surrounding each vessel, small collections of round lymphoid cell-like bodies resembling in character the nuclei described in walls of the bloodvessels. (Fig. 2 $\times 300$.)

Fig. 2.



“The diagnosis of neuroma amyelinicum, which, thus far, rests merely upon the appearances of the growth, is further substantiated by the exclusion of unstriated muscular tissue and fibrillar connective tissue, with which tissues the growth has been confounded.

“1. In regard to the first-named tissue, leaving out of the question the unlikelihood of the situation, the peculiar and distinct manner in which hæmatoxylin stains the nuclei of unstriped muscular fibres is absent in any section under observation. The fibres of unstriated muscular tissue form flattened bands, interlacing in various directions, and not round fibres such as these show themselves to be, and while, indeed, they possess nuclei, these are not contained in a sheath. Finally, which is conclusive evidence, no muscular cell whatsoever could be discovered even after prolonged maceration in hydrochloric acid and subsequent careful teasing.

"2. The problem of entirely eliminating connective tissue is confessedly a more difficult one. While freely admitting the presence of a large amount of connective-tissue stroma, this does not do away with the entity of those fibres that have been designated as nerves. The size and thickness of the fibres, their roundness in cross-section, the presence of a distinct sheath containing nuclei along its continuity, and the difference and contrast between them and what is undoubtedly fibrous or connective tissue, all give evidence of their histological nature.

"But more than this: applying the liquor calcis and baryta water test, I find, after carefully teasing a macerated specimen of this kind, that the compact masses and bundles of connective tissue are resolved into their ultimate fibrils, but that lying among them are the same fibres, designated as nerves, unaltered by seventy-two hours' contact with these reagents. Furthermore, in those sections treated with carmine and osmic acid, by way of an attempt at double staining, I find the papillæ of the skin and corium are stained with carmine, while the greater mass of the growth is coloured brownish black by the osmic acid. The experiment is quoted not so much as giving strong proof, but more as a curious fact which seems to show the presence of two tissues, and that the carmine has selected the connective tissue of the section and allowed the rest—nervous tissue—to be stained by the osmic acid, although, of course, not the inky black colour which it gives to the medulla of medullated nerves?"

"Prof. Virchow, in his *Krankhaften Geschwülste*, in speaking of amyelinic neuromas, says:—

"These cases (amyelinic neuromas) have been until recently always reckoned among fibrous or fibro-nucleated tumours, because after treating them with acetic acid we perceived nothing but a great mass of rather long nuclei lying among a firm, fibrillated or striped ground substance. . . . More careful handling of the preparation, however, convinces one that these nuclei are contained in fibres, and that these fibres lie for the most part parallel to one another and form quite distinct bundles, which, in the richness and regularity of their ovalish, narrow nuclei, differ from all connective-tissue bundles. . . . An essential difference between these neuromata and fibromata and so-called fibro-nucleated tumours rests in this, that in the first the nuclei are not contained in cells simply, but in fibres which have a double contour and can be followed for some distance. The cross section of these fibres is round or at least roundish, but never star-shaped or reticulated, as is the case with the fibromas."

"The description, as will be seen, agrees in all essential particulars with the appearances of the growth under consideration. A drawing accompanying Prof. Virchow's remarks also bears a close likeness to that representing the disease in our case. In one osmic acid preparation medullated nerve fibres were seen in cross-section. They were by no means frequent; the axis-cylinder was not well marked, and it was not possible to trace them to any connection with nerve trunk or branch. In one section only did there seem to be any connection between the nerves of the mass of the growth and those already existing in the skin. The elements of the skin differed in no essential particular from the appearances described in Prof. Düring's original paper, pp. 8 and 9. The muscular tissue was teased and examined, mounted in glycerine. There was marked atrophy of the muscular fasciculi, and in many places there were evidences of fatty degeneration.

"These investigations were carried on in the laboratory of Dr. H. Formad, under his direct supervision, and the diagnosis has, in all particulars enumerated in the report, been confirmed by him.

GEORGE DE SCHWEINITZ."

From the foregoing observations and studies, it may be therefore stated that the disease is a skin disease strictly speaking. No other structure was in any way involved. Concerning the nature of the growth there can remain no doubt. The microscopic studies made by myself originally, and later by Drs. Formad and de Schweinitz, which I have had the pleasure of corroborating, prove conclusively, I think, that we have a true neuroma of the skin—one of the rarest of diseases. It may further be remarked that the complete reunion of the cut cords of the plexus, and the regeneration of normal nerve-tissue is also a matter of great interest. The thorough repair instituted by nature in the form of the stout cicatrix is likewise remarkable, though reunion was of course anticipated from the clinical history. Considering the character of this bond, it is questionable whether the excision of even two inches of the nerve would have proved sufficient to have prevented reunion.

In closing my report, I take pleasure in formally acknowledging my indebtedness to Drs. Boenning, Formad, and de Schweinitz, whose labours, I need scarcely state, give to this paper its chief value.

ARTICLE IX.

CONTRIBUTIONS TO THE STUDY OF THE TOXICOLOGY OF CARDIAC DEPRESSANTS. I. CARBOLIC ACID; A SUMMARY OF FIFTY-SIX CASES OF POISONING, WITH A STUDY OF ITS PHYSIOLOGICAL ACTION. By EDWARD T. REICHERT, M.D., Formerly Demonstrator of Experimental Therapeutics and Instructor in Experimental Physiology in the Post-Graduate Course in Medicine, in the University of Pennsylvania.

LAST June, while pursuing a series of experiments in connection with a paper on the dangerous properties of chlorinated, brominated, and iodated anæsthetics,¹ it occurred to the writer that all decided cardiac depressants were capable at times, like chloroform, of acting wholly out of proportion to the dose used, even under apparently similar circumstances, and several instances were cited of poisoning by aconite, apomorphine, and tartar emetic, in connection with the cases due to the above classes of anæsthetics, to illustrate this belief. Not feeling satisfied to allow so interesting a question, and one of such momentous importance to the therapist, to remain unsettled, a survey of the articles on the toxicological effects of cardiac depressants was made. But the absence of statistical papers was so noticeable, and the details given so inadequate, and oftentimes so inaccurate, that the urgent need was felt for a series of papers which would faithfully depict the poisonous phenomena and such other

¹ See page 50 of the preceding number of this Journal.

features as would seem to be of interest and value to the therapist and toxicologist.

I have selected carbolic acid as the earliest to be discussed, because the knowledge of its physiological action among the profession seems to be so very limited, and as no study of any large number of cases has yet been made—the deductions appearing in the several essays already published evidently being based on a consideration of but few cases.

The following are the records of the cases, which have been very considerably condensed:—

CASE I. Female, aged 43.—*Dose and preparation taken.* Amount (?); crude.—*Symptoms.* Insensibility; retching; breathing stertorous; pupils contracted; pulse intermittent.—*Treatment.* Chalk; 7 ounces of olive oil injected into the stomach by stomach pump, and subsequently an emetic was given.—*Result.* Death in six hours.

Autopsy and Remarks. Strong smell of carbolic acid detected; œsophagus dark gray colour, harsh to the touch, and the inner part friable and tearing readily. The mucous membrane of the stomach was in a similar condition. The intestines presented the appearance from a dark gray above to a bright red and congested appearance in the jejunum. Brain congested. Blood incoagulable, and remained fluid up to time of writing, which was five days. Brain contained 3ij serous fluid. (Harrison, *Lancet*, 1868, ii. p. 133.)

CASE II. Male, aged 64.—*Dose and preparation taken.* Rather over 3j in 3j of oil.—*Symptoms.* In ten minutes: the patient looked ill; flushed, perspiring, ineffectual attempt to vomit; eyes rolling wildly as if bewildered; mouth, tongue, and fauces whitened. (Mustard given, but stomach ineffectually evacuated; pump used and albumen given; castor oil injected into stomach.) In an hour: mental equilibrium restored; skin hot and perspiring; face flushed; pupils strongly contracted; pulse, rapid and soft; breathing somewhat laborious; voice harsh; deglutition difficult; thirst; retching; burning pain and tenderness at epigastrium. Acute gastritis supervened; features occasionally distorted by convulsive twitchings; hot, dry skin; temp. 102.5°, cold extremities; respiration shallow; pulse 140, small and hard; pupils contracted; intelligence perfect. Collapse ensued; imperceptible pulse; and cadaverous features.—*Treatment.* Emetics, albumen, castor oil, and stomach pump.—*Result.* Death in twelve hours from a failure of heart.

Autopsy and Remarks. The man had a compound comminuted fracture of the thigh, and in the above toxic condition bore manipulation with perfect equanimity, as if he was almost anesthetized. (Anderson, *Lancet*, 1869, i. p. 179.)

CASE III. Female, aged 44.—*Dose and preparation taken.* Nearly 3j impure carbolic acid.—*Symptoms.* Dyspnoea; epigastric pain; restlessness; mouth and lips whitened; brown stain on the chin; pulse 140, feeble; difficulty in swallowing; stupor; breathing slow and stertorous; pulse exceedingly feeble; comatose.—*Treatment.* Zinc sulphate, olive oil; no vomiting ensued; stomach pump used, and warm water injected.—*Result.* Death in 50 minutes.

Autopsy and Remarks. Left lung greatly congested; right emphysematous; mucous membrane of both lungs congested; left ventricle of heart strongly contracted, right partially so; mucous membrane of mouth, œsophagus, and stomach converted into a soft white material; blood fluid, became light red on exposure. (Brabant, *Lancet*, 1873, i. p. 302; also in *Guy's Hosp. Rep.*, 1879.)

CASE IV. Female, aged 7.—*Dose and preparation taken.* 3ss diluted with 3j glycerine and water.—*Symptoms.* Ten minutes—insensible; pulse almost imperceptible; pupils contracted; conjunctival reflex gone; temperature lowered; respiration catching and slowed; died comatose.—*Treatment.* Stomach pump, gruel and oil, enema of brandy; heat of body maintained.—*Result.* Death in 1 hour and 25 minutes.

Autopsy and Remarks. Right side of heart full of blood, which was dark and fluid; also larger vessels full of similar blood. Left ventricle contracted, and con-

tained only two drachms of blood. No abnormality in lungs or abdominal viscera, except alimentary canal. The tongue, mouth, fauces, œsophagus, and stomach and upper part of duodenum unaffected by poison, but small intestine for three feet was whitened. Blood fluid; brain contained much venous blood; no effusion into the ventricles, which were quite dry; odour of carbolic acid detected in brain. (Rickards, *Lancet*, 1873, i. p. 876.)

CASE V. Female, aged 20.—*Dose and preparation taken.* ʒiiss impure undiluted acid.—*Symptoms.* Mouth and tongue whitened; pain in œsophagus and stomach; swallowed readily; hesitancy in speech in four or five minutes; stammers; totters in walk; insensibility in eight minutes; unable to swallow; breathing stertorous; pupils unaffected; pulse frequent, small and intermittent; extremities warm up to the time of death.—*Treatment.* Six eggs given through stomach tube; water and magnesia; the contents of stomach drawn off; artificial respiration for half an hour with some benefit.—*Result.* Died in little more than an hour after taking the poison.

Autopsy and Remarks. Lips and nose blistered; sinus of dura mater gorged with dark tarry blood; bloodvessels on surface of brain full; lungs and heart healthy, the latter empty; mucous membrane of mouth whitened, and of œsophagus and stomach congested and peeled off with the slightest touch; mucous membrane of intestinal canal did not appear much changed; smell of carbolic acid in all the organs; green stains in the stomach. (Swain, *Lancet*, 1869, i. p. 395.)

CASE VI. Male, adult.—*Dose and preparation taken.* Probably a mouthful of impure acid.—*Symptoms.* Probably ten minutes elapsed, then vomiting; comatose; contracted pupils; intermittent pulse; stertorous breathing; frothing at the mouth; livid appearance of eyelids, lips, and ears.—*Treatment.* Emetic by means of stomach-pump, but without success.—*Result.* Died in three-quarters of an hour.

Autopsy and Remarks. Tongue and fauces corroded. (Gerrard, *Lancet*, 1871, i. p. 672.)

CASE VII. Female, aged 37.—*Dose and preparation taken.* fʒj of—acid 1–10 linseed oil—(nearly 50 grains).—*Symptoms.* Twelve minutes or more, sufficiently conscious to reply when spoken to sharply; skin moist; face dusky; pulse weak; pupils slightly dilated; unconsciousness; duskiness deepened; moisture of skin increased; pupils dilated; pulse quick, irregular, and scarcely perceptible; breathing regular and noisy. In three-quarters of an hour, coma complete; face livid; pupils dilated; body and extremities warm and moist; pulse imperceptible; soft palate and tongue relaxed; breathing slow and regular; reflex sensibility of conjunctiva was now altogether lost.—*Treatment.* Stomach washed with tepid water; the oil which came out did not smell of the acid; aqua ammoniæ (2 gttts. FFF.) injected into vein of forearm, and in a few seconds the radial pulse became perceptible. Repeated injection in one-quarter of an hour with benefit.—*Result.* Recovery. (Shaw, *Lancet*, 1875, ii. p. 451.)

CASE VIII. Female, aged 29.—*Dose and preparation taken.* ʒss (crude).—*Symptoms.* 5 minutes: collapse; cold; clammy; pulse 112, almost imperceptible; conjunctiva insensible; pupils dilated and immovable; respiratory movements almost imperceptible, and were 56 in a minute; froth from the nostrils; breathing stertorous; cardiac movements weaker and intermittent; pupils contracted somewhat; face livid.—*Treatment.* Olive oil given first with a spoon and then with pump; solution of sodium carbonate given; stomach emptied; brandy per rectum, and mixed with milk; sinapisms to legs.—*Result.* Died in forty-five minutes.

Autopsy and Remarks. Rigors strongly marked; dependent parts congested; skin corroded at angles of mouth; froth from inflamed nostrils; blood fluid, and smelt of carbolic acid; brain smelt of acid; ventricles of brain full of serous fluid, odour of carbolic acid detected; vessels full of fluid blood; trachea in a state of acute inflammatory congestion; lungs and bronchial tubes congested; heart pale and flabby, and contained fluid blood in all cavities; mouth and tongue blanched; mucous membrane of œsophagus white and rough, and the epithelium appeared replaced by false membrane which could be stripped off, leaving a red congested surface; cardiac end of stomach reddened, and in a state of acute inflammatory

congestion, mucous membrane soft and smooth; bladder contained four ounces of urine, smelt of carbolic acid, but otherwise normal. (Packer, *Lancet*, 1878, ii. p. 511.)

CASE IX. Male, aged 32.—*Dose and preparation taken.* 10 A. M., swallowed a quantity of a solution.—*Symptoms.* Immediately: nausea; cold sweats; stupor; unconsciousness (12.30, magnesia given); profound insensibility; noisy, tracheal rales in breathing; death apparently imminent. (Mustard poultices applied to the whole surface.) 5 P. M.: temperature risen nearly to normal; coma; complete relaxation of the limbs persisted; anæsthesia of skin and mucous membrane of mouth, nose, pharynx, and bladder; complete loss of reflex excitability; cornea and conjunctiva insensible; pupils contracted; respiration (48) stertorous, with tracheal rales; pulse (128) small. He had passed no urine, but some which was drawn off was yellow, with a violet tint by reflected light, and which smelt of carbolic acid. On its surface were some oily drops. Some drawn blood was of a singular brown colour, and possessed the odour of the acid. The clot formed was soft and diffuent, and did not contract.—*Result.* Death in nine and a half hours.

Autopsy and Remarks. All parts smelt strongly of carbolic acid. No distinct lesions of the mucous membrane were found above the stomach. The membrane of the stomach was thickened, marked with black cauterized spots, and elsewhere deeply congested, and in one or two places were submucous hemorrhages; it was not ulcerated; kidneys deeply congested; some spots of effused blood under the capsule and in cortex; the tubuli were perfect; epithelium fatty and completely degenerated. Albumen and acid found in the urine. (Rendu and Patrouillard, *Jour. de Pharm. et de Chem.*, Dec. 1871; *New Remedies*, April, 1872, p. 341.)

CASE X. Male, aged 60.—*Dose and preparation taken.* Not more than $\bar{3}j$. (?)—*Symptoms.* Frothing at mouth; countenance turgid; quite speechless.—*Result.* Died in a few minutes of shock and depression.

Autopsy and Remarks. Body discoloured; superficial veins engorged; mouth and throat whitened; faint odour of carbolic acid; veins of scalp gorged with dark blood; brain free from any sign of congestion; but little fluid in cerebral ventricles, merely moisture; lungs full of dark blood, but normal; heart pale, fatty, quite empty; stomach contracted and coats thickened; contained about an ounce of turbid, pinkish fluid, smelling strongly of carbolic acid and giving a strong reaction; mucous membrane whitened on tops of furrows but reddish in furrows; œsophagus slightly affected; no trace of severe local effects in intestines, which were reddened along superficial surface. The appearance of the mucous membrane extraordinary and characteristic; cardiac end of stomach principally affected. (Barlow, *Lancet*, 1869, ii. p. 404.)

CASE XI. Female, aged 60.—*Dose and preparation taken.* $\bar{3}vj$ (?) Calvert's used in XI., XII., and XIII.; applied acid to surface of body; had itch.—*Symptoms.* In a few moments smarting pain and headache; giddiness, approaching insensibility. Twenty-five minutes: prostration; spasmodic breathing; total insensibility; surface of body hard and dry; occasional spasm of diaphragm; pupils unaffected and responded to light. Continued unconscious for four hours, the breathing was laboured and slow.—*Treatment.* Acid washed from skin by tepid water and soft soap; brandy with ammonia and ether, some was swallowed.—*Result.* Died in four (?) hours.

Autopsy and Remarks. Small patches of sloughy skin about the body. (Machin, *British Med. Journ.*, 1868, i. p. 220.)

CASE XII. Female, aged 23.—*Dose and preparation taken.* (See Case XI.) Applied acid to surface of body.—*Symptoms.* (See, also, Case XI.) Unconscious for five hours; consciousness gradually returned; attempts at vomiting; mustard given; but little of stomach contents were evacuated; retching considerable; strong odour of carbolic acid in expiration; respiration lost spasmodic character, quick and irregular; continued pain in head and throat. In the morning epileptiform convulsions came on; pain in head better, but throat unrelieved; symptoms of congestion of lungs; gradually sank; conscious until the last. Patient said to be an epileptic, and to have had convulsions when application was made.—*Treatment.* Emetic of mustard given with but little effect; strong coffee given with benefit; leeches to temples in course of morning; alkaline mixture of

potassium chlorate and chlorine given, but symptoms of congestion of lungs came on and patient collapsed.—*Result.* Died in about forty hours.

Autopsy and Remarks. Small patches of sloughy skin about the body. (Machin, *British Med. Journ.*, 1868, i. p. 220.)

CASE XIII. Female, aged 68.—*Dose and preparation taken.* (See Case XI.) ; applied the acid to surface of body ; had itch.—*Symptoms.* (See, also, Case XI.) Rallied in about four hours ; states that as soon as dressing was used, she felt giddy-drunk ; head felt constricted by band ; unconsciousness ; no vomiting in this case ; pulse (80) regular and feeble ; skin harsh, dry, puckered ; no vesication in any of the three cases (XI., XII., XIII). Skin thrown off often in scaly patches.—*Treatment.* (As in Case XI.)—*Result.* Recovered in twenty-one days. (Machin, *British Med. Journ.*, 1868, i. p. 223.)

CASE XIV. Female, aged 51.—*Dose and preparation taken.* A case of excision of elbow-joint. Dressed with lotion, one part to fifty.—*Symptoms, etc.* Dec. 2, seventy-two hours : "shivering fit ;" tongue rapidly fouled ; pulse 100–120, weak and irregular ; skin cold and clammy ; very uncontrollable vomiting ; face pinched and anxious ; spirits depressed. Fifth day, rapidly sinking ; pulse 130–140, and thready ; tongue has a brown coat ; cerebation clear ; urine scanty and loaded with lithates, but not dark or carbonaceous. The carbolic lotion was the same day changed and flaxseed used instead, and in the course of forty hours pus was present in poultices, and the constitutional irritability removed. Improving up to Dec. 15, when lotion was again employed (same strength). Thirty-six hours : vomiting, and same symptoms as before. The discharge, which was purulent on the 15th, became scanty and rusty on the 17th ; poultices again substituted on the 18th.—Poultices used up to the 27th, when lotion was applied with a similar result as above ; wound was now nearly healed. The lotion was discontinued and warm water used.—*Result.* Recovered.

Remarks. Nothing was found in this case to be able to check the vomiting caused by the carbolic acid. (Lightfoot, *British Med. Journ.*, 1870, i. p. 331.)

CASE XV. *Dose and preparation taken.* One part to five of linseed oil, used as a dressing for bedsores in typhus fever.—*Symptoms.* Two days dressed with lint soaked with the carbolic acid and oil. After the second dressing severe vomiting ; urine became very dark. On discontinuing carbolized oil, the symptoms ceased, and urine became natural. No signs of blood corpuscles in the urine could be detected with the microscope, only carbonaceous particles.—*Result.* Recovered. (Wilks, quoted by Lightfoot, *Brit. Med. Journ.*, i., 1870, p. 332 ; also *Guy's Hosp. Reports.*)

CASE XVI. Male, adult.—*Dose and preparation taken.* Carbolic enema.—*Symptoms.* During administration fit occurred ; stertorous breathing.—*Result.* Death in twenty minutes. (Worcester Infirmary, quoted by Lightfoot ; *Ibid.*)

CASE XVII. Female, aged 1 year.—Had extensive ulceration of gluteal region and labia, following from sitting on block on which some of the disinfectant, $\frac{3}{4}$ j to Oj of water, had been thrown two days before.—*Symptoms, etc.* The next morning after sitting on the block the blistering had commenced and ulceration rapidly followed. Used fullers' earth and French chalk with comforting effect. On fifth day used lotion of lead-water with glycerine, several sloughs formed and separated ; child became weaker from exhaustion and shock ; some signs of internal inflammation ; usual remedies used.—*Result.* Died on tenth day.

Autopsy and Remarks. Rectum inflamed ; patches of inflammation in intestine ; right pleura much inflamed. Child had been perfectly healthy before. (Sandwell, *British Med. Journ.*, ii., 1870, p. 382.)

CASE XVIII. Male, aged 47.—*Dose and preparation taken.* $\frac{3}{4}$ j or $\frac{3}{4}$ ij (?) (erude, black and oily).—*Symptoms.* Shortly afterward found insensible ; smelt of carbolic acid ; speechless ; cannot walk ; unconscious ; stertorous breathing ; puffing of lips at expiration ; heat of body natural ; pulse disturbed (84–106) and intermitting ; emetic had no effect ; lips, gums, and tongue whitened ; no muscular movements in three or four hours ; eyelids closed ; pupils contracted to a pin's point ; at six and one-half hours opened eyes and moved the extremities ; after this pupils expanded ; began to speak ; asked for cold water, but never regained complete consciousness. Then laborious breathing occurred ; difficult muco-purulent expectoration ; breathing easier and coma lessened ; severe pain in back ;

respiration 46-48. Eight and one-half hours: passed a quantity of very dark-coloured urine, which smelt of carbolic acid. Afternoon, attempted to pass water, but unsuccessfully; brow, face, and hands covered with a clammy perspiration; collapse.—*Treatment*. Castor oil, olive oil, and emetic; stomach-pump (would not work); ammonium carbonate and brandy, but to no purpose.—*Result*. Died in thirteen and one-half hours.

Autopsy and Remarks. Lividity of back and front of neck and chest; face sallow; pupils natural; watery froth and yellowish fluid at mouth and nostrils, which smelt of carbolic acid; clot in longitudinal sinus; dura mater and arachnoid congested; blood smells of carbolic acid; serum found in ventricles and subarachnoid; gray matter of brain of pink hue; intense congestion of vessels on under surface of pons and medulla. Mucous membrane of mouth, throat, and gullet whitened, sodden, soft, and easily detached; 3ij thick brownish pulp in stomach; great curvature covered with hard, reddish, and elevated points the size of shot, without any marked congestion; similar points on other portions of stomach, tending to follow the course of the vessels; stomach otherwise normal, perhaps more vascular. Portions of intestine of slate colour; containing brownish pulpy substance; heart full of dark firmly clotted blood on both sides, right side 3iv, left 3ij; 3iv whitish urine in bladder; universal smell of carbolic acid; blood everywhere firmly clotted. (Ogston, *Brit. Med. Journ.*, 1871, i., p. 116.)

CASE XIX. Male, adult. *Dose and preparation taken*. Exposed for three hours to fumes of strong carbolic acid.—*Symptoms*. Violent convulsions with trismus; quite comatose; lividity of face; stertorous breathing; extremities and surface cold; pulse scarcely perceptible; warm bath was given; in forty minutes convulsions ceased; sensibility partly restored; face and neck assume a natural hue; symptoms improved. Six hours later, passed urine, which was more acid than normal, but no odour of carbolic acid; complained of giddiness; no pain in head, but pain in face and eyes, with taste of carbolic acid in mouth and throat, and gastric irritation.—*Treatment*. Wrapped in blankets; hot water to feet; cold applications to head, and mustard to nucha; aperient mixture, bismuth subnitrate, dilute hydrocyanic acid (P. L.), a gargle of potassium chlorate and myrrh, and a liniment of belladonna with soap liniment to neck and face; warm baths.—*Result*. Recovered. (Nuthank, *Brit. Med. Journ.*, 1872, ii., p. 579.)

CASE XX. Male, aged 7.—*Dose and preparation taken*. Probably a mouthful of the impure carbolic acid.—*Symptoms*. Stertorous breathing; complete stupor; total muscular relaxation; anæsthesia; pulse feeble and rapid (160); temperature lowered; pupils contracted; salivation; power of swallowing lost; failure of respiration and pulse; collapse.—*Result*. Died in about seven hours after symptoms were first observed.

Autopsy and Remarks. Post-mortem in twenty-four hours: rigor mortis present, but not to any marked degree; cerebral sinuses distended by dark fluid blood and some soft coagula; cerebral vessels in a similar condition; little fluid in subarachnoid space and ventricles; faint odour of acid detected, also in thorax, but intensified; venous congestion of thorax and abdomen; blood dark and fluid; lungs congested, œdematous, and emphysematous; heart empty, left ventricle contracted, right one flaccid, also empty; no coagula in great vessels; mucous membrane of mouth, throat, and œsophagus white, sodden, congested, but not detached; stomach same character; contained some injection, but no capillary hemorrhage; liver, spleen, and kidneys hyperæmic; bladder contained eight ounces urine of an olive-green tint, peculiar mixed odour, contained no albumen; carbolic acid detected in urine with chemical tests, and also in viscera. (Ferrier, *Brit. Med. Journ.*, 1873, i. p. 167.)

CASE XXI. Male, aged 36. *Dose and preparation taken*. Probably 3j. of undiluted acid.—*Symptoms*. Five minutes: mortal agony; lividity; protrusion of eyeballs; continued subdued cry of "wild and fear-inspiring tone," which was broken by gasping respiration and inefficient attempts to vomit; condition followed almost immediately by profound insensibility. From the first the pulse was very rapid and feeble; respiration short and infrequent; pupils unaffected.—*Treatment*. Olive oil poured in the mouth; warm water was injected in stomach and withdrawn, impregnated with carbolic acid; second injection of olive oil;

difficulty of introducing pump experienced.—*Result.* Died in thirty minutes, apparently asphyxiated.

Autopsy and Remarks. Superficial veins, especially, extremely distended with blood; lips and chin excoriated; dura mater congested with dark venous blood; arachnoid at vertex thickened with gelatinous matter; brain healthy; lungs emphysematous in front, passive congestion posteriorly; pericardium contained 3j serum; heart healthy, all cavities full of blood, which was dark and perfectly fluid, with no coagula; mucous membrane of larynx, trachea, and subdivisions highly congested, granular, and softened; and air-tubes contained small quantities of olive oil and carbolic acid; tongue shrunken, pale, indurated; mucous membrane of œsophagus white, glistening, softened, peeling off as if sealed; mucous membrane of stomach softened and eroded, and with muscular coats reduced to a state of pulp, parts above orifices sustained most injury, and were of a dull, deep slate colour; small intestines similarly affected. (Hearder, *Brit. Med. Journ.*, 1878, i. p. 584.)

CASE XXII. Male, adult.—*Dose and preparation taken.* Two or three drachms in a mixture.—*Symptoms.* Immediately fell insensible and convulsed, and in eighteen minutes extremities were cold; pulse scarcely perceptible and irregular; breathing stertorous; consciousness lost; trismus.—*Treatment.* Stomach evacuated; bled to Oj.—*Result.* Recovered on eleventh day. (Hearder, *loc. cit.*)

CASE XXIII. Male, aged 72.—The patient was suffering with a suppurating stump.—*Dose and preparation taken.* Sucked carbolic acid from a sponge which had been placed under the bed as a disinfectant.—*Symptoms.* Semi-comatose; pulse (98) feeble; respiration 48; olive oil and castor oil given, which was swallowed very slowly, also zinc sulphate and tartar emetic; no vomiting; pulse and respiration better; coma.—*Treatment.* Olive and castor oil; ʒj zinc sulphate; two grains tartar emetic.—*Result.* Death in about four hours.

Autopsy and Remarks. Lips, chin, right side of face, right breast and hand coloured brown, and a strong odour of carbolic acid; dura mater and arachnoid very much congested; brain substance healthy. Mucous membrane of mouth and tongue white and softened, and of larynx thickened; of pharynx and œsophagus pale, thickened, soft, and corroded; of stomach soft, corroded, congested, and also white. Intestines softened, and part corroded; odour of carbolic acid detected in the cæcum. (Biddle, *Brit. Med. Journ.*, 1873, i. p. 611.)

CASE XXIV. Female, aged 43.—*Dose and preparation taken.* 3j impure carbolic acid.—*Symptoms.* Five minutes: insensible; face blanched and perspiring; pupils contracted; pulse 100, feeble and irregular; respiration stertorous, breath smelt of carbolic acid; slight lividity of lips and tips of fingers. Rapidly grew worse, and became much swollen before death.—*Treatment.* Emetic and stomach-pump; the patient could not swallow the emetic, and the pump only brought out a small quantity of contents which smelt strongly of carbolic acid; difficulty of introducing pump experienced.—*Result.* Died in one and a half hours.

Autopsy and Remarks. Angles of mouth and skin discoloured and shrivelled; interior of mouth whitened; tongue dry and chippy; mucous membrane of œsophagus dry, shrivelled, and brownish; heart feeble, both ventricles were empty; mucous membrane of stomach readily peeled from walls, white patches over it, and whole slightly inflamed; mucous membrane of duodenum similarly affected, but less so; dura mater natural; arachnoid thickened and opaque; brain apparently healthy. (Sutton, *Med. Times and Gaz.*, 1868, i. p. 456.)

CASE XXV. Male, aged 19. The patient was suffering with enteric fever, and the acid given by mistake.—*Dose and preparation taken.* ʒss impure carbolic acid.—*Symptoms.* Unable to swallow; almost pulseless; difficult respiration; lividity and a mottled appearance; stools black-brown; urine dark brown or blackish; collapse.—*Treatment.* Brandy given; nutrient enemata of beef-tea and brandy, and iced milk by mouth.—*Result.* Died in two days. (Wiltshire, *Med. Times and Gaz.*, 1870, ii. p. 474.)

CASE XXVI. Male, aged 65.—*Dose and preparation taken.* ʒss-3j (?) impure acid.—*Symptoms.* Insensible; stertorous breathing; mouth and throat filled with mucus; stains of acid on chin; pupil contracted; pulse 40-50, and

laboured; life nearly extinct; respiration irregular; heart-beats inaudible.—*Result.* Died in fifty minutes.

Autopsy and Remarks. General aspect as if dead by asphyxia; brownish lines from angles of mouth. Blood dark, fluid. No coagula, except in lungs. Mucous membrane of mouth and œsophagus whitened, firm, congested, hard, and tough. Stomach contained $\frac{3}{4}$ iv of thick, turbid fluid; smells of carbolic acid. Mucous membrane white, shrivelled, in granular masses, and easily scraped off; rugæ hard. Larynx, trachea, and bronchi filled with transparent mucus, streaked with blood. Heart flabby, and slightly fatty; left side contained little blood; right empty. Viscera congested. Arachnoid cavity contained $\frac{3}{4}$ x fluid. (Jeffreys and Hainsworth, *Med. Times and Gaz.*, 1871, i. p. 423.)

CASE XXVII. Female, aged 7.—*Dose and preparation taken.* Probably a mouthful, drunk from a demijohn of it used for disinfectant purposes.—*Symptoms.* Lips white, shining, and puckered; odour of carbolic acid detected; face of a leaden hue; cold sweat; eyes fixed; pupils slightly dilated; extremities cold; complete insensibility. Inability to induce emesis. Some improvement after use of stomach pump. Consciousness returned one and half hours after poisoning; heart feeble; pulse at wrist not countable. Pain in epigastrium. In three and three-quarter hours, respiration 40; pulse small and could not be counted. Pupils contracted; extremities cold. Three and three-quarter hours later, pulse 144; respiration 36; temperature 98° ; less jactitation; drinks milk; “feels sick;” pupils widely dilated; relaxation of bowels. Twenty-third hour, face pale; respirations somewhat stertorous; slight convulsions; eyelids partly closed; semi-conscious; asks for milk constantly; lividity less; pupils dilated; extremities cold; respirations 50; relaxation of bowels. In fifteen minutes, unconsciousness; increased stertor; died five minutes later.—*Treatment.* Egg beaten up and poured down throat with a pump, three minutes after poison was taken, and shortly after albumen was given in same way. Later, a mixture of olive and castor oils, and afterwards wine of ipecac, were given. Stomach pump brought out albuminous coagula, which smelt of carbolic acid.—*Result.* Died in twenty-four hours.

Remarks. This patient was suffering with ascites. (Woodman, *Med. Times and Gaz.*, 1875, i. p. 421.)

CASE XXVIII. Female, aged 40.—*Dose and preparation taken.* $\frac{3}{4}$ iv crude carbolic acid, which was taken at 9 o'clock in the evening.—*Symptoms.* In twenty minutes, uneasiness; collapsed; blanched; no vomiting or convulsions; respiration stertorous; pupils contracted; pulse hardly perceptible, not rapid. Washed out the stomach. Two hours later, condition better, but remained unconscious. Midnight, semi-conscious; pupils contracted; pulse quick and feeble; surface cold; convulsive twitchings; vomited bloody and oily matter. Some return of consciousness; able to swallow brandy and milk, but vomited. Late that day the evacuations of the bowels were black, and afterwards dark brown. Urine smoky colour and aromatic odour; no albumen. Epigastric tenderness. Dark-brown stain on upper lip, mouth, and chin. For a couple of days later she remained in a dangerous condition, and the urine remained smoky; she then improved slowly.—*Treatment.* Stomach pump; mustard to calves of legs and heart; stomach thoroughly washed; Oj olive oil injected. First day, milk and brandy, barley water, milk and lime-water, and ice.—*Result.* Recovery; left the hospital on the 17th, having taken poison before midnight on the 15th. (Davidson, *Med. Times and Gaz.*, 1875, ii. p. 597.)

CASE XXIX. Male, aged 57.—*Dose and preparation taken.* Amount (?) eighty per cent. acid.—*Symptoms.* Carried into hospital insensible, and emetics given. Vomited freely. Tongue and mouth were quite white; large white patch from mouth to chin; sore throat during the night, but well otherwise. Olive oil applied locally, and a mixture of mucilage given, $\frac{3}{4}$ j, every four hours, internally. Next day, sore throat; urine dark, clear, faintly acid, no albumen, sp. gr. 1044. Carbolic acid found in urine. Second day, sore throat; fauces covered with white patches; tongue corrugated; bowels open; appetite good; left hospital in the afternoon.—*Treatment.* 25 grains zinc sulphate effectual; olive oil externally; mist. mucil. $\frac{3}{4}$ j every four hours.—*Result.* Recovered; discharged second day. (Forster, *Guy's Hosp., Med. Press and Circular*, 1878, ii. p. 42.)

CASE XXX. Male, adult.—*Dose and preparation taken.* About $\frac{3}{4}$ ss Calvert's No. 5.—*Symptoms.* "Sudden and fatal sedation of nervous centres." Probably died without suffering.—*Treatment.* Emetics given, but produced no effect.—*Result.* Died in ten or fifteen minutes. (Hill, *Rich. and Louis. Med. Journ.*; quoted in *N. Y. Med. Record*, 1873, viii. p. 383.)

CASE XXXI. Male, adult.—*Dose and preparation taken.* $\frac{3}{4}$ ss impure.—*Symptoms.* Suffered no uneasiness, except burning pain in throat for a few days. He had been an opium eater, and took some olive oil as soon as he found out his mistake.—*Treatment.* Olive oil.—*Result.* Recovered. (Outerbridge, *N. Y. Med. Record*, 1873, viii. p. 517.)

CASE XXXII. Male, aged $2\frac{1}{2}$.—*Dose and preparation taken.* $\frac{3}{4}$ j pure; equal to Calvert No. 2.—*Symptoms.* Immediately child ran about the room crying; then instantly became unconscious; lividity; eyes staring; respiration stertorous; foaming at the mouth and nose; pupils dilated, but responding to light; twitching of muscles of the extremities; capillary circulation slow. Vomiting excited to a slight degree by titillating the fauces; quantity of tenacious, partially coagulated mucus expelled at each attempt at vomiting. Vomited mucus mixed with blood. Temperature raised; cough croupy. Throat whitened and shrivelled. Urine dark olive-green colour, with odour of the acid. Stools greenish, thin; became dark and smoky after standing some days.—*Treatment.* Olive oil; white of egg; vomited; milk and lime-water; bismuth and chalk every three hours.—*Result.* Recovered (Dusau, *N. Y. Med. Record*, 1878, xiii. p. 289.)

CASE XXXIII. Male, aged 5.—*Dose and preparation taken.* Cavity of open abscess injected with diluted acid, according to Callender, of London.—*Symptoms.* Radial pulse absent; skin pale, cold, and damp; respiration short, hurried, and over 100. (Brandy given hypodermically); pupils contracted. Belladonna given and repeated, pupils then became dilated; pulse perceptible; respiration 100, reduced to 70.—*Treatment.* Hypodermic injections of brandy; belladonna.—*Result.* Recovered. (Post, *N. Y. Med. Record*, 1879, xv. p. 378.)

CASE XXXIV. Aged 2.—*Dose and preparation taken.* $\frac{3}{4}$ j of mixture of equal parts carbolic acid and olive oil taken at eight o'clock.—*Symptoms.* Five minutes, pain in bowels; soon became insensible. Ten minutes, partially comatose; pulse 120; difficult breathing; congestion of lungs; paralysis of muscles of pharynx. 8.30, insensible; left pupil slightly dilated, but sensitive; extremities cold. 8.45, left iris more dilated, less sensitive; breathing apparently improving under ammonia. 9, paralysis more marked; breathing becoming difficult, artificial respiration necessary. 9.20, pupils more sensitive to light; congestion of lungs becoming less. 9.30, pulse 140; breathing about normal; extremities warm. 10, improving. 12.30, vomiting some; oil given. Next day better; complains of pain in head.—*Treatment.* Carbonate of ammonia; castor oil.—*Result.* Recovered in a few days. (Ghent, *Canada Lancet*, 1875, i. p. 67.)

CASE XXXV. Female, aged 50.—*Dose and preparation taken.* $\frac{3}{4}$ j; woman in delicate health.—*Symptoms.* Did not complain of much burning sensation; gave sodium bicarbonate and olive oil, followed by extract of ipecac. General debility; violent burning sensation from fauces to stomach; pulse slow, full, regular; semi-comatose; can scarcely move her limbs; relaxed; with difficulty swallowed oil. Pulse unchanged. Forty minutes after taking poison, apomorphia given, followed by emesis; vomit smelt of carbolic acid. Violent efforts at emesis every twenty minutes for one and a half hours. No sinking or flagging of pulse; no cold extremities. Urine copious, smoky colour, smells strongly of carbolic acid; continued copious for twelve hours longer, and gradually improved; bowels relaxed. Five and a half hours after poisoning, pulse 96, full and regular; temperature 101° . Lay in a critical condition for two days; then greatly improved.—*Treatment.* Sodium bicarbonate, olive oil, enema of oil, apomorphia (about half a grain) hypodermically, mucilage, milk, and water.—*Result.* Recovered. (Semple, *Virginia Med. Monthly*, May, 1877, iv. p. 138.)

CASE XXXVI. Female, aged 39. Suffering with carcinoma uteri; the neck being nearly destroyed, leaving the body of uterus open.—*Dose and preparation taken.* Applied, locally, cotton-wool pessaries saturated with carbolic acid, glycerine, and oil, the carbolic being in the proportion of one part to eight of liquid.—*Symptoms.* This treatment was continued from Nov. 17th to Jan. 7th, when

she suddenly became insensible; convulsions; inability to void urine. Suppression of urine continued until the 11th, when some water was discovered in the bed. 17th, another convulsion; fatal collapse. For several days before death, anasarca.—*Treatment*. Dry-cupped loins, hot fomentations, salines, ten-minim doses tr. digitalis.—*Result*. Died. (Edwards, *Practitioner*, 1869, iii. p. 324.)

CASE XXXVII. Female, aged 41. Suffering with cancer.—*Dose and preparation taken*. Injection ordered of "one part of carbolic acid, glycerine $\frac{3}{4}$, and $\frac{3}{4}$ xx water." This was used *ter in die* for some days; then "applied daily a cotton-wool pessary saturated with carbolic acid, tannin, and glycerine, the strength being one of acid to sixteen parts of water."—*Symptoms*. Commenced treatment Sept. 6th. Sept. 27th, hiccough; sickness; prussic acid and salines given, with a blister to epigastrium. Oct. 2d, rigors; extremities cold. 3d, partially unconscious; face œdematous; legs much swollen; no water passed. 4th, no better; delirium at night; no water passed, and bladder emptied by passing a catheter. 5th, hemorrhage (uterine); anasarca; and at times, insensibility. 10 P. M. drew off $\frac{3}{4}$ ij bloody urine. Oct. 8th, decidedly worse. 10th, little more urine passed. 11th, died comatose.—*Result*. Died. (Edwards, *Practitioner*, 1869, iii. p. 324.)

CASE XXXVIII. Male, aged 40.—*Dose and preparation taken*. Probably a whiskeyglassful of the impure acid.—*Symptoms*. Pallor; coldness of surface; insensibility, and coma; respiration slow and laboured; pupils fixed and insensible to light; no erosion or mark on face or lips. Stomach pump brought up a quantity of dark fluid. Next day passed dark, almost black, urine; no carbolic acid or albumen in secretion. Pulse frequent and weak.—*Treatment*. Turpentine enema, sinapisms, stomach pump, ammonia to nostrils, opium, and morphia.—*Result*. Recovered. (Warren, *Irish Hosp. Gaz.*, 1875, iii. p. 17.)

CASE XXXIX. Female, aged 33.—*Dose and preparation taken*. $\frac{3}{4}$ ss liquefied carbolic acid.—*Symptoms*. Immediately "felt mad;" "fought the air." Fifteen minutes, uneasiness. 4 o'clock, uneasiness; extremities somewhat flexed and rigid; trismus; pupils contracted; pulse feeble; respiration attended with "rattles." 7 A. M. pulse extremely weak; surface cold. 12.30, severe burning in stomach; sore throat; painful deglutition; headache; no thirst; temperature 98° ; pulse 90 and weak. 7 P. M. delirious at times; nausea, but no vomiting; hurried respiration.—*Treatment*. Morphia, brandy, beef-tea, milk, eggs, etc.—*Result*. Recovered. (Walker, *Boston Med. and Surg. Journ.*, 1879, p. 797.)

CASE XL. Female, aged 35.—*Dose and preparation taken*. Scarcely less than $\frac{3}{4}$ viii.—*Result*. Died very soon.

Autopsy and Remarks. Mucous membrane of œsophagus, stomach, and small intestine thickened and corrugated, and of a bluish-white colour. Action of poison ceased abruptly fifty inches from pylorus. Esophagus at point of stomach so much contracted that the point of a probe was passed with difficulty. Blood fluid, very dark; cavity of heart moderately full. Viscera and urine exhaled the odour of the acid. Mode of dying seems to be *syncope* or *shock*. (Way, *Trans. Path. Soc.*, 1873, xxiv. p. 93.)

CASE XLI. Aged 21 months.—*Dose and preparation taken*. $\frac{3}{4}$ j crude carbolic acid.—*Symptoms*. Ten minutes, motionless; insensible, but recovered in a little time. Pupils contracted, insensible to light; conjunctiva insensible; pulse 120 and very weak; cold and clammy; lividity of lips; respiration impeded; strong tarry odour of breath; vomited frothy liquid. Unable to swallow emetic. Breathing grew worse; (artificial respiration used); lividity worse; (tracheotomy, which enabled the child to breathe easier). Four hours, respiration 80; anaesthesia; contraction of pupil. Child vomited later.—*Treatment*. Unable to introduce emetic into the stomach, as œsophageal walls seemed spasmodically contracted; artificial respiration; tracheotomy performed.—*Result*. Died in ten hours.

Autopsy. Twelve hours after death. Brown discoloration of skin about mouth, which is dry and shrunken. Bronchi contained a brown-red liquid, which choked tubes and smelt of acid. Mouth whitened; dense epithelium loosely connected; œsophagus the same. White line terminated abruptly at stomach. Stomach, at anterior part, lower curvature, and in isolated patches on anterior

and posterior surfaces, greatly changed. Change consisted of red-based patches with red borders, mostly limited to rugæ. Surface diphtheritic; walls of the jejunum natural. (Taylor, *Guy's Hosp. Rep.*, 1868, xiii. p. 233.)

CASE XLII. Male, aged 50.—*Dose and preparation taken.* Injection into piles (internal) of a "liquid composed partly of carbolic acid." Had used on two occasions before with success, five weeks before the present one.—*Symptoms.* 11 A.M. Felt at once "uncomfortable." 4 o'clock, had a chill, with nervous distress. Passed a bad night; sleeplessness; nervous distress; insupportable giddiness and strange feeling about the head. 6 A.M. treatment for carbolic-acid poisoning commenced. Afternoon, "nervous chill, although warm;" weak, irregular pulse; giddiness, and impending convulsions. Giddiness continued for three days.—*Treatment.* "Eliminative character, with the bromides in addition."—*Result.* Recovered. (Wright, *Cinn. Lan. and Clin.*, Aug. 1878, p. 68; vol. i., New Series.)

CASE XLIII. Female, aged 22.—*Dose and preparation taken.* $\frac{3}{4}$ ss Calvert (No. 4). Patient just recovering from a second attack of relapsing fever. Took poison at 4.15 A.M. on September 17th.—*Symptoms.* 5 minutes, complete unconsciousness; conjunctival reflex gone; pupils normal and insensitive to light; surface livid, clammy; perspiration, copious; extremities cold; respiration husky, with considerable mucous rattle; occasional moaning. Pulse shaky, feeble; no whiteness or unusual appearance about the lips. Power of deglutition gone. 5.30, pulse improved. 7.30, able to swallow. 8.30, greatly improved; pulse 108, soft and feeble; lividity gone; body warm, but clammy. 12.30, passed green-black urine; vomiting; stools light-coloured and offensive; looseness of bowels. 18th, urine more clear and light. 19th, symptoms double basic pneumonia. Pulse ranged between 108 and 130 until Oct. 13th, when she suddenly became worse and died at 9 A.M.—*Treatment.* $\frac{3}{4}$ j brandy and milk enema; with stomach tube, gave in course of half hour \mathcal{O} j and $\frac{3}{4}$ ss brandy. Fomentations to abdomen; hot bottles to feet.—*Result.* Died.

Autopsy and Remarks. Autopsy: The woman had double pneumonia, which the author attributes to the effects of the acid. (Tennent, *Glasgow Med. Journ.*, 1870-1, p. 74-78.)

CASE XLIV. Male, adult. Acute eczema.—*Dose and preparation taken.* One part of carbolic acid to four of lard applied on lint to arms and thighs, and covered with oiled silk.—*Symptoms.* In an hour and a half "profound coma; pupils firmly contracted; breathing stertorous; pulse weak, quick, flickering; inability to swallow."—*Result.* (?) (*Canada Med. Journ.*, 1871, vii. p. 8; quoted by Tennent.)

CASE XLV. Male, aged 32.—*Dose and preparation taken.* $\frac{3}{4}$ ss in the oily state.—*Symptoms.* Five minutes, insensible; face livid; bathed in profuse, clammy perspiration; eyes open and turned up; pupils contracted and do not respond to light; mouth open, filled with frothy mucus; respiration stertorous; pulse imperceptible; heart sounds scarcely audible; forced to swallow raw eggs and $\frac{3}{4}$ vj mustard water—vomited; could not pass tube on account of stricture of œsophagus.—*Treatment.* Raw eggs, mustard water, galvanic current, and artificial respiration; by stomach tube large quantities of soap, lime-water, olive oil, flaxseed mucilage, and fluids were given; also counter-irritation.—*Result.* Died in one and a quarter hours.

Autopsy and Remarks. Eighteen hours after death: Rigor well marked; blood dark and fluid, smelt strongly of carbolic acid; venous system greatly congested; membranes of brain congested; sinuses all filled with dark blood; mouth, pharynx, and œsophagus whitened; stomach contained about $\frac{3}{4}$ vij chocolate-coloured fluid, mucous membrane chocolate coloured, roughened, and charred, and in some places completely destroyed, exposing the muscular layer, and everywhere readily detached; destruction mostly near cardiac pouch; the pylorus thickened, and velvety to the touch; discoloration and destruction continued through the duodenum, fading along small intestines; whole alimentary tract highly congested; heart flabby and empty; lungs highly congested; bronchi contained frothy mucus; kidneys and liver congested. (Houston, *Med. and Surg. Rep.*, 1870, xxii. p. 32.)

CASE XLVI. Male, aged 23.—*Dose and preparation taken.* Probably a good swallow of the impure—"not likely more than an ounce."—*Symptoms.* Two

minutes: insensible, pulseless; pupils dilated; face pallid and pinched; respiration gasping; involuntary discharge of urine; respiratory interval prolonged; heart ceased; then the respirations.—*Result.* Died in about three minutes, not more.

Autopsy and Remarks. Stomach moderately distended, intensely congested; externally being of a dark venous hue; contained Oj of whitish-coloured liquid, smelling strongly of carbolic acid; mucous membrane has a white film, and beneath this was congestion and a chocolate coloration; the membrane was strongly corrugated, thick, higher and more rigid than normal, especially marked at cardiac extremity, and along the greater curvature, and in lower end of œsophagus. Scalp and meninges congested, and vessels filled with dark fluid blood. (Taylor, *Phil. Med. Times*, 1873, ii. p. 284.)

CASE XLVII. Male, aged 48.—*Dose and preparation taken.* Gr. v of crystals in $\frac{3}{4}$ ij water.—*Symptoms.* Immediately experienced burning in the throat and stomach; vertigo; nausea, with retching, but could not vomit; paleness; hyperæmia of fauces; pulse 90; cold and nervous (gave lime-water, tartar emetic, and ipecac); no vomiting; nausea and vertigo; giddiness continued for eight hours, when emesis occurred, which relieved his nausea; but the vertigo trouble persisted until the following day.—*Treatment.* Lime-water, tartar emetic, and ipecac.—*Result.* Recovered. (Winslow, *Phil. Med. Times*, 1874, iv. p. 817.)

CASE XLVIII. Aged two years.—*Dose and preparation taken.* $\frac{3}{4}$ ij Calvert, No. 4.—*Symptoms.* Immediately screamed; drank $\frac{3}{4}$ iv lime-water, $\frac{3}{4}$ j olive oil, then insensibility supervened; ten minutes, profound coma; tactile sensibility totally abolished; surface pallid; copious perspiration; limbs flaccid; eyelids closed, bluish; pinched expression; frothy saliva. Pulse (160) soft, feeble, irregular; respiration (70) laboured, irregular, jerking, stertorous, and hissing; mucous membrane of tongue and fauces white, with patches of marginal streaks of capillary injection. Pupils widely dilated, and do not respond to light. Oil placed in pharynx immediately rejected, attended with suffocative symptoms. Apomorphine given occasionally; shudder, followed by slight clonic convulsions; prolonged spasm of glottis causing deep cyanosis. Any attempt to clear the mouth, or to give anything, excited dangerous spasm of glottis and general convulsions. A prick of a pin would cause the same thing. In the course of a couple of hours consciousness returned, and he took considerable powdered chalk and sugar, white of egg, iced port wine, and milk. Died with meningitic symptoms.—*Treatment.* Lime-water and olive oil; apomorphine.—*Result.* Died in twenty hours. (Winslow, *Ibid.*)

CASE XLIX. Female, aged 20.—*Dose and preparation taken.* A hundred and forty-five grains in glycerine as an enema for ascarides.—*Symptoms.* She rapidly became convulsed, delirious, and finally nearly or quite insensible; surface cold and moist; pulse weak and flickering; pupils contracted; breathing stertorous.—*Treatment.* Injection of milk, and rectum thoroughly washed; ammonia, camphor, and diffusible stimulants given by the stomach.—*Result.* Recovered. (Pinkham, *Med. and Surg. Rep.*, xix. 1868, p. 492.)

CASE L. Female, aged 29.—*Dose and preparation taken.* Half teacupful of carbolic lotion.—*Symptoms.* Vomiting soon began, accompanied with drowsiness; pupils natural. No drugs given. Free from symptoms next day. Urine a deep brown colour.—*Result.* Recovered. (*St. George's Hosp. Reports*, 1879, p. 25.)

CASE LI. Male, adult.—*Dose and preparation taken.* Drank from a jug in mistake for whiskey.—*Symptoms.* In three minutes unconsciousness; no noticeable symptoms outside of the feeble, fluttering pulse, and frothing at the mouth.—*Result.* Died.

Autopsy and Remarks. Œsophagus contracted, and shows well-marked longitudinal folds; surface smooth, and of a peculiar bright, slightly yellowish-white colour, "closely approaching that of freshly-pulled molasses candy;" stomach strongly contracted, and summits of rugæ marked with white lines, and in interstices were found granular detritus. (Harris, *Boston Med. and Surg. Journ.*, 1880, i. p. 494.)

CASE LII. Female, aged 40.—*Dose and preparation taken.* "One or more swallows, ninety-five per cent. acid"—"at least $\frac{3}{4}$ ij entered stomach."—*Symptoms.* Five minutes: comatose; respiration stertorous; pupils contracted and

insensible; profuse perspiration. (Tartar emetic failed to produce emesis.)—*Treatment.* Tartar emetic, lime-water, and olive oil freely.—*Result.* Died in three hours. (Park, *Chicago Med. Gaz.*, 1880, i. p. 228.)

CASE LIII. Male, adult.—*Dose and preparation taken.* Lotion to necrosed tibia.—*Symptoms.* Pulse very feeble and flickering; respiration difficult; pale and anxious; feet and hands cold. (Wineglassful of brandy.) In three or four hours patient felt better, but a little nervous. (Opiate.) Urine next day smelt strongly of carbolic acid.—*Result.* Recovered. (White, *N. Y. Med. Gaz.*, 1871, p. 274.)

CASE LIV. Male, aged 20.—*Dose and preparation taken.* $\mathfrak{z}\text{j}$ pure fluid carbolic acid.—*Symptoms.* First swallowed milk, raw eggs, glycerine, and mustard; then inability to swallow. Half hour after poisoning, comatose condition; uneasiness, except when aroused; short, laborious, somewhat stertorous respiration; coolness, lividity, perspiration; feeble, almost imperceptible pulse.—*Treatment.* Forced down milk through tube. Pumped out the contents of stomach, and forced in milk and sweet oil, and pumped out again, and repeated.—*Result.* Recovered.

Remarks. Vomited when recovered from coma. Felt as well as usual next morning, except a slight burning in the stomach. (Glisan, *Amer. Journal of Med. Sciences*, 1880, lxxx. p. 452.)

CASE LV. Female, aged 13.—*Dose and preparation taken.* $\mathfrak{z}\text{ij}$ pure carbolic acid. Water immediately given; then emetic, with no effect.—*Symptoms.* In three minutes unconsciousness; seven minutes "radial pulsation gave way;" eight to twelve minutes tonic spasms, mainly of flexors; breathing slightly stertorous.—*Treatment.* Enema of brandy and milk, and stimulating applications.—*Result.* Died in nineteen minutes.

Autopsy and Remarks. Considerable corrosion of mouth and throat. (Sigler, *Louisville Med. News*, 1880, ix.-x. p. 294.)

CASE LVI. Male, aged 24. Had herpes on right side, extending from nipple to axilla, about five inches square.—*Dose and preparation taken.* Painted the herpetic part with a saturated solution of the acid.—*Symptoms.* Twenty minutes, faint, dizziness, weakness in legs, and symptoms of collapse. Symptoms lasted for half an hour.—*Result.* Recovered. (Paul, *Phil. Med. Times*, 1880, x. p. 404.)

Besides these cases, there have been reported seven others in English journals to which I have not had access: Cleaver (*Liverpool Med. Surg. Rep.*, 1871, v. 45); Wood (*Ibid.*, p. 110); Maloney (*Australia Med. and Surg. Journ.*, 1872, xvii. p. 73-77); Allen (*Ibid.*, 1880, ii. p. 116); Peters, (*Indian Med. Gaz.*, 1863, viii. p. 423); Sheddon (*Glasgow Med. Journ.*, 1872, v. p. 266); Woodham (*Virginia Clin. Record*, 1871-2, i. p. 272). There are also to be found a number in journals of other languages.

Superficially reviewing the general symptoms of carbolic acid poisoning presented by the above cases, we find that the poison is absorbed with great rapidity, and the evidences of its toxic properties are soon manifested. In the course of a few minutes they become so rapidly aggravated that the system is profoundly affected; and, indeed, at least two cases offer good illustrations of its acting with the same deadliness and frightful rapidity as have been noted in cases of poisoning from the more virulent hydrocyanic acid. In cases which have been under observation from the time of the ingestion of the poison, symptoms have been observed to appear almost immediately, which indicate that the acid finds its way into the circulation as soon as it comes in contact with an absorbent surface, whether it be the skin, stomach, rectum, pulmonary acini, or wounds.

The first symptom generally appreciated is a burning pain in the parts of the body with which the acid has come in contact, provided the acid has been of sufficient concentration; in some cases, however, no pain is experienced and

even a diminution of sensibility may be present. Disorders of cerebation are then likely to follow, as evinced by a confused condition of thought, difficulty of speech, depression, restlessness and bewilderment, vertigo, delirium. Insensibility is one of the most frequent, earliest, and constant of the phenomena, but occasionally it does not make its appearance until late. Nausea and vomiting may be present, but this does not occur in more than about twenty per cent. of the cases. Uncontrollable vomiting occurred in one case, while in another it was very severe, and in a third was moderate. Even drugs seem to have but little power to bring about emesis, for in about twenty per cent. of the cases in which the different emetics were given, vomiting occurred only in about one-half of them. The pulse and respiration, like the nervous system, are seriously affected. The former in a large percentage of the cases becomes feeble, frequent, and intermittent, but in very exceptional instances was slow and weak. The respiration was soon affected, and in more than half of the cases, where it was particularly noted, was stertorous to a greater or less degree, but generally well marked; and in rare instances is described as being dyspnoëic, slow, husky, or hurried. Occasionally the face is flushed, but more often a paleness is present. The skin is exceptionally hot and dry, and in a larger portion of cases is cold and clammy—especially noticeable in the extremities; and in a single case a hot skin was followed by coldness.

Lividity, more or less marked, is a frequently noted symptom; salivation was also observed. The temperature was stated to have risen above the normal in three cases, while in two it was lowered, and in a sixth case was natural. Frothing at the mouth and nose occurred in about ten per cent. of the cases, and deglutition was difficult in five and impossible in ten. In four the odour of the acid was detected in the exhalations. In ten cases the urine was noted as being coloured greenish, blackish, or brownish. Relaxation of the bowels was also occasionally noticed, and the stools in several instances were described as being brownish, blackish, or greenish. The pupils were variously affected, but in over half of the cases in which they were specially examined were found to be contracted; in less than a fifth they were dilated; in four were unaffected; in two dilatation was followed by contraction; and in another, there was first dilatation, then contraction, and ultimately dilatation. Convulsive movements occurred in fourteen cases; in one they were violent; in three were mere twitchings, and in a similar number trismus was present. In one case epileptiform convulsions were present, but this patient was stated to have been an epileptic, and in another case impending convulsions were recorded; sometimes they are only facial. Anæsthesia was also recorded in about fifteen per cent. of the cases, but was undoubtedly present in the vast majority where insensibility was recorded to signify this condition together with a loss of consciousness. Protrusion of the eyeballs, pain in the head or back, hiccough, muscular weakness, tremors, thirst, harshness of

voice, and involuntary micturition were also exceptionally noted. Symptoms of pneumonia, pulmonary congestion, or of meningitis, or mucopurulent expectoration, were observed in six cases.

Pain in the mouth, œsophagus, and stomach, frothing at the mouth or nose, insensibility, difficult or impossible deglutition, a cold and clammy skin, stertorous respiration, a frequent, small, and intermittent pulse, contracted pupils, anæsthesia, and a brownish, blackish, or greenish urine are the most constant and characteristic symptoms, and the latter is probably pathognomonic.

Experiments made on the lower animals yield results in accordance with the symptoms produced in man. According to Lemaire (*De l'Acide Phénique*, Paris, 1865), Neumann (*Archiv f. Derm. u. Syph.*, i. 1869, p. 425), Labbé (*Archiv. Gén. de Méd.*, 1871, p. 45), Stone (*Phila. Med. Times*, ix., 1878–9, p. 616), and Salkowski (*Pflüger's Archiv*, Bd. v., 1872), toxic doses in frogs produce paralysis of the posterior extremities followed by paralysis anteriorly, and of the whole muscular system. Lemaire states, however, that when frogs are placed in aqueous solution the anterior extremities are first affected. On the mouse and rat, Kempster (*Amer. Jour. of Med. Sciences*, July, 1868, p. 37) found that when they were confined to a jar and a sponge suspended a short distance from the bottom impregnated with the acid and the animal compelled to inhale the vapour, well-marked symptoms of poisoning rapidly occurred. The mouse in five minutes staggered as if intoxicated and then grew better. These paroxysms recurred several times during an hour and a half, when the animal became convulsed and died. A rat, in less than a minute, appeared sleepy, and as if intoxicated, muscular weakness was also apparent. In three-quarters of an hour it failed to notice sounds, and shortly after, to all appearances, was in a state of profound anæsthesia. Tremors, convulsions, and death followed. Two other experiments on rats confirm these results. In pigeons, according to Husemann (*Schmidt's Jahr.*, Bd. clv. p. 274), the same characteristic results occur as in mammals. Salkowski (*loc. cit.*), Neumann (*loc. cit.*), Lemaire (*loc. cit.*), and Husemann (*loc. cit.*) found in rabbits and dogs, tremors, muscular weakness, slowing of the respiration, dyspnœa, salivation, dilated pupils, diminished sensibility, convulsions, and death. Before convulsions rabbits lie on their sides kicking in mid-air. Temperature is diminished, and, according to Husemann, hæmaturia and albuminuria are occasional phenomena. A very curious fact was also noticed in frogs that, after awhile, violent convulsions were induced by very slight irritation; and at times when the posterior extremities were paralyzed, the anterior remained in a state of exalted reflex excitability (Stone, and Bert and Jolyet).

The *nervous system* is profoundly affected, and the train of symptoms following the action of the acid on this portion of the economy is decidedly well marked. *Convulsions* in the lower animals are more prominent phe-

nomena than in man, and are almost constant symptoms. Husemann states them to be one of the characteristic phenomena; but in man in less than about one-third only of the above cases were such movements present, and in only one were they at all violent. The convulsions are generally clonic, but may assume a decidedly tetanic character. That they are not peripheral seems proven by the experiments of Salkowski, Labbé, and Stone, for these observers found that they did not occur in the extremities which had been deprived of their central nervous connections by severing the nerves going to them; although they did occur when the limb was protected from the poison by ligaturing the bloodvessels. It is, therefore, certain that they must be central in their origin. Salkowski, Bert and Jolyet (*Gaz. Méd. de Paris*, 1872, xxvii. p. 188, etc.), and Stone (*loc. cit.*) found them occur in animals with cut cords, and hence they concluded that the convulsions were of spinal origin. These results, however, are not in accord with those of Labbé and Haynes (*Phila. Med. Times*, 1874, iv. p. 407), who state that convulsions did not occur in animals thus operated upon. From the disparity in these records it would seem that these phenomena are both spinal and cerebral in their origin, or else the former investigators did not completely sever the cord in the animals operated upon. Labbé removed the optic lobes and cerebri of animals, and found the convulsions still occurred when the basal ganglia were irritated, so that if the convulsions are exclusively cerebral they must, undoubtedly, if these results are accurate, be due to an action on the centres at the base of the brain; and the presumption that they are probably cerebral seems to be strengthened by the fact of their clonic character, yet the occurrence of a tetanoid-paralysant condition in frogs after they are profoundly under the influence of the poison suggests that these convulsions are dependent upon a similar action to that which produces like phenomena in the poisoning by atropine, apomorphine, and strychnia,¹ and hence, must be of spinal origin. Labbé does not give the details of his experiments; and Haynes used such large doses that it seems readily explainable why he observed convulsions anteriorly only; for, as above noted, the anterior extremities may be in a state of exalted reflex excitability while the posterior are paralyzed; and, moreover, when paralysis occurs it attacks the posterior extremities first—indeed, large doses may immediately cause general paralysis. When we consider the excessive doses used by Haynes (3ij–3iij liquefied acid), it seems clear that the reason why he did not get convulsions posteriorly was because these large doses brought about an immediate condition of paralysis in the posterior extremities, with an attendant condition of hyper-excitability anteriorly. If, as before noted, we have a coexistent condition of paralysis and convulsions as has been described by several observers, it must be clear that if convulsions did not occur in the

¹ Reichert, *Phila. Med. Times*, 1881, p. 711.

posterior extremities, after section of the cord, unless the section was made during the convulsive stage, a negative result would be of little value as proof that convulsions were cerebral; while a positive result, such as obtained by at least three experimenters, would be very weighty in proving their spinal origin, and especially so, since the experiment was performed many times by a single investigator with the same result. It is extremely improbable that in every one of these experiments in which section of the cord was made it was incomplete.

Reflex action, according to Labbée (*loc. cit.*), is not lost, but he gives no details of experiments. Stone, in a very careful investigation of this function, obtained very decided results, and found that reflex action in frogs was primarily diminished and secondarily increased,¹ and that large doses may cause a decided exaltation. He also found that after section of the cord in the dorsal region hyperexcitability in the posterior extremities was not induced, nor was the diminished reflex activity present in the early part of the experiment as before; he therefore concludes that the diminished reflex irritability, as well as the increase, was due to a stimulation and ultimately to a depression of Setschenow's inhibitory centres in the base of the brain. This, however, appears to be inaccurate because after section of the cord convulsions occurred which were induced by slight stimuli, and consequently there must be some other reason for this condition of reflex excitability besides a depression of these centres, and it is probable that this exaltation is due, in part at least, to a depression of spinal reflex inhibitory centres which are similar in their function to Setschenow's. Late in the experiment, when the sensory function appeared to be highly exalted, the motor function was decidedly diminished, and Stone thinks that these phenomena were, like those of strychnia poisoning, due, as Kölliker suggested, to the excessive strain on the motor nerves; yet, this can scarcely be true if his own statement, as well as those of Salkowski (*loc. cit.*) and Hoppe-Seyler (*Pflüger's Archiv*, 1872, Bd. v.) be correct: that the motor and sensory nerves and muscles are not materially affected; and then again it is exceedingly improbable that the depression of the motor nerves in strychnia poisoning is due only to excessive strain, as we have much proof to show.

From the above results it seems evident that the toxic influence of carbolic acid in the production of convulsions and on reflex phenomena, is entirely centric. Stone (*loc. cit.*) found that when he could induce no reflex movements by irritating a sensory nerve, irritation of the cord produced marked movement in the posterior extremities; and he therefore concludes that the spinal action is probably confined to the motor columns. If this is so, the phenomenon of a consentaneous existence of exalted sensibility and motor depression is readily explainable in the

¹ See Case XLVIII. for similar symptoms in man.

fact that both conditions are due to paralysis; the exalted sensibility to a paralysis of reflex inhibitory centres,¹ and the motor depression to a paresis of the motor columns of the cord.

The *cerebral* functions are early and seriously affected, the first symptoms, as at times observed, being restlessness, bewilderment, hesitancy of speech, depression of spirits, and delirium, stupor, insensibility, and coma.

The action of the acid on the *circulation* has not been thoroughly studied. Hoppe-Seyler (*loc. cit.*) found that the arterial tension was not materially affected until convulsions were present, when it was decidedly increased, remaining in this condition for a prolonged period, and then gradually falling and continuing in a decline until it reached a point far below the normal. Salkowski and others found that the heart after death was arrested in diastole, and that this condition existed whether by slow or rapid poisoning. In man the heart generally presents strong evidence of the result of a decided and direct poison, and is to be found in a pale, flabby, and distended condition; although in several instances the left side especially was found to contain but little blood, and in at least one case this viscus was described as being healthy and empty. The increase of arterial pressure as observed by Hoppe-Seyler would seem at first sight to be dependent upon the convulsions, but Lemaire's and Salskowski's experiments seem indicative that there are other features present, for the former observer states that the systoles in the early part of the poisoning are increased in their power, and that the arterioles can be seen to contract; Salkowski declares that the rapidity of the blood-current in the capillaries is primarily increased and afterwards diminished. While there can be no doubt that carbolic acid acts ultimately as a direct and decided cardiac depressant and causes death very frequently, if not in the large majority of cases, in this way, yet the results of the above experiments are such as to preclude any decisive opinion until a further research is made. The frequent, feeble, and intermittent pulse, so frequently noticed in man, is strong evidence of a decided depressant action on the heart, as is also the slow and feeble pulse, which, at times, has been noted.²

The *respirations* in the earlier stages of the poisoning are decidedly increased in frequency, but later they are deep, slow, and laborious, and possess a marked stertorous character. According to Salkowski, the frequent respirations are very shallow and are almost entirely costal in their character, the diaphragm taking but little part. It was also found that respirations were accelerated in animals with cut pneumogastric nerves; and, furthermore, in normal animals, when the vagi nerves were cut dur-

¹ For a discussion of "Convulsions due to Depression of Spinal Reflex-Inhibitory Centres," etc., see my paper in *Phila. Med. Times*, Aug. 13, 1881, p. 711.

² Several experiments which I recently performed in connection with the blood-pressure, indicate that large doses of the acid, intravenously injected, cause an immediate cardiac paralysis.

ing the existence of frequent respiration, the movements became decidedly slowed, and were deep and regular. These results indicate both a centric and peripheral action, and that the altered respirations are due to a stimulation of both the pneumogastric peripheries and centres, while it is probable that the diminished respiratory movements, which occur later in the poisoning, are due to a paralysis of the same.

The *pupils* in the above case were more often contracted, but no experiments have been made on animals to determine how this action was brought about.

The *temperature* change in man is variable, as we have already seen, and in animals it has been stated to be diminished; according to Erls (*Schmidt's Jahr.* Bd. clxiv. p. 148), the acid diminishes the heat in animals in which fever was produced by injecting putrid substances. Latrobe and others found that carbolic acid causes changes in the blood-corpuscles out of the body; although no change was found to occur in the blood in the economy.

The *local action* of the poison is that of a decided irritant and caustic, for when applied to the living tissues it induces swelling, redness, and, generally, severe burning pain, which is followed by a white eschar and a loss of sensibility in the part. When applied to the skin the eschar becomes dried and translucent, presenting the appearance of being cornified. The same change has been observed by Taylor (*Guy's Hospital Rep.* 1868, xiii. p. 233) to occur in the mucous membrane of the stomach. This gentleman states that the superficial layer of the stomach mucous membrane was destroyed, and the dead part showed all the structures perfect, and they were rendered sharp in outline by a sort of cornification which had taken place, and that no inflammatory process existed. The loss of sensibility is not confined to the circumscribed tissue directly destroyed by the acid, but extends to at least an appreciable depth.

When swallowed, the mouth, throat, and œsophagus are whitened and present the appearance of being covered with a whitish, grayish, or brownish pseudo-membranous substance, which is soft or pulpy or diphtheritic, and easily detached from the underlying structures, which are then found to be in various stages of congestion, and frequently described as having a chocolate colour. The œsophageal mucous membrane is sometimes spoken of as being thickened, hardened, rigid, and corrugated.

The *gastric mucous membrane* is seldom affected throughout, and as might be expected the most formidable lesions are to be found in those portions which the acid would reach in its most concentrated condition; consequently, the cardiac end and the greater curvature are the most to suffer.

The stomach walls may so far be disorganized, that portions of the muscular coats are reduced with the mucous membrane to a pulp. The latter is generally found to be corrugated, congested, and corroded, and

covered with a pulpy or diphtheritic substance which may be of a whitish, grayish, or chocolate colour. The membrane is sometimes described as being thickened, tougher, more rigid, blackened, sodden, or chocolate-coloured. The summits of the rugæ have been observed to be whitened, while the interstices were red, and contained granular detritus; by another writer, elevated points about the size of shot, without any very marked congestion, were reported; and by still another, red-based patches, with well-defined borders, limited more particularly to the rugæ, were noted. The microscopical appearances of the mucous membrane have already been quoted from Taylor's paper (*loc. cit.*).

The *stomach* may be contracted or dilated, or be found in an intermediary condition. The amount of fluid it contains is variable, as is also its nature, for it may be of a whitish colour, or pinkish, brownish, or chocolate-coloured; may vary greatly in its consistency; and may possess in a greater or less degree the odour of the acid.

The occurrence of nausea, retching, and emesis, or the utter impossibility of inducing these phenomena by giving emetics by the stomach, seems readily and satisfactorily explained when we consider the irritant and corrosive properties of the acid; and at the same time that emesis may follow a local application of the acid to an absorbent surface. When the acid first reaches the gastric mucous membrane it at once irritates the peripheries of the vagi nerves, and, whether we have vomiting following the irritation, or whether the irritation is too quickly superseded by a physiological destruction of the nerve peripheries, is obviously determined by the relation existing between the rapidity with which the irritant effects are followed by those of a caustic character. That the peripheries of the pneumogastric nerves are soon seriously affected and functionally destroyed, is corroborated by the fact of the great difficulty or even impossibility of inducing emesis by drugs which effect this phenomenon by a direct local irritant action. Yet emesis, or the failure of the drug to induce it, cannot always be due to a local action only, unless it is dependent upon an effort of the system to eliminate the poison through the gastro-intestinal tract, for vomiting supervened in some of the above cases after a local application of the acid to absorbent surfaces such as the skin, wounds, rectum, etc. It is, therefore, probable that the emesis is, in part at least, centric, the drug acting in small quantity as a stimulant to the vomiting centres and in larger ones as a depressant.

What becomes of carbolic acid in the system, and the condition in which it is absorbed, are interesting questions which we are unable to answer. It has been suggested, since it possesses the property of coagulating albumen, that it is absorbed in some combination. Its presence in the blood can be a matter of but little doubt, since in autopsies the odour of the acid was frequently very strong and distinctly perceptible in the different viscera. Lemaire (*loc. cit.*) believes that it is *eliminated* to a considerable extent by the lungs, for he found the odour on the breath of

dogs and rabbits very perceptible; and we have instances of the elimination of the drug by this channel in at least four of the cases of poisoning in man. The lungs are certainly not the only channel by which elimination takes place, for Hoppe-Seyler (*loc. cit.*) found it in the saliva, and Salkowski (*loc. cit.*) and numerous other observers have found it in the urine, but in what form it is eliminated is a matter of much doubt. Patrouillard (*Jour. de Pharm. et de Chem.* 1871, p. 459) states that he obtained an oily liquid by means of ether which reacted to the characteristic tests, and which he thought to be pure acid; yet Salkowski believes that it exists as an alkaline carbolate.

The urine in over 20 per cent. of the cases was noticed to be coloured, and in eight of them was described as being smoky or brownish; in one it was a green-black, another had a violet tint by reflected light, and another was at first an olive-green, but became black and smoky on standing. Albumen was noted as occurring in a single instance.¹ The urine may or may not smell of the acid, or have a peculiar mixed or aromatic odour, and has been noted in exceptional instances to be bloody, copious, scanty, more acid, loaded with lithates, or to present a normal appearance. The coloration may make its appearance within a couple of hours and last for several days, and at times it can only be distinctly perceived when the urine is held up to the light.

The cause of the coloration appears to be still invested in much doubt, and it has been suggested that it is the result of the destruction of a part of the carbolic acid in the system and the consequent formation of an oxidative product—for it will be remembered that when the acid and potassium permanganate are brought in contact the former is oxidized and oxalic acid results—which is eliminated by the kidneys, and this fact seems to be strengthened by the researches of Salkowski, who found, as already stated, that oxalic acid appears in the urine of animals poisoned with carbolic acid. Husemann at first believed that the hæmoglobin was the cause of the colour, but he afterwards abandoned this theory because of the urine fully clearing up, after acidifying, and then heating, and especially because the odour of the acid was given off during the former process. Husemann, besides other observers, could detect no corpuscular elements of the blood in the urine; nor was there an excess of iron present. Waldenström and Almèn (*Zeitschrift Allgem. Apoth. Verein*, Jan. 1872), in a later series of experiments with similar urine, obtained, by adding sulphuric acid and then distilling, a product smelling strongly of carbolic acid, and which responded to the calcium chloride with a blue colour; and, moreover, when the product was shaken with ether, the latter left, on evaporation, drops of the acid. Similar results were obtained by Städeler (*Ann. d. Chem. und Pharm.* Bd. lxxvii. p. 17) with the normal urine of the cow by a similar

¹ Albumen is reported as being found in a case reported by Waldenström and Almèn.

process; and these results have been corroborated by Buliginsky (*Med. Chem. Untersuch.* 1872, p. 234), and Hoppe-Seyler (*loc. cit.*). The latter observer has, however, shown that the acid does not exist in the normal urine, but that the substance thus obtained is probably a product of the decomposition of indican; a fact which seems to be strengthened by the researches of Salkowski (*Centralb. f. Med. Wissensch.* 1876, p. 820), who found in cases of ileus an increase of the substance from which the acid is formed *pari passu* with the onset of the trouble; consequently, experiments of Waldenström and Almèn do not, therefore, prove that the acid they found was eliminated by the kidneys. There can be no doubt, however, but that carbolic acid does exist in the urine in cases of poisoning, as the odour as well as the reaction to characteristic tests signify; yet there must also be some new products formed, because the carbolic acid urine when subjected to nitric acid, and afterwards potassium hydrate, and then concentrated, gives a blood-red followed by a pea-green and violet colour. Carbolic acid added to the urine outside of the body will not yield this play of colours (*Schmidt's Jahr.* Bd. clxiv. p. 144). Microscopical examinations reveal carbonaceous particles, and it is difficult to determine whether the particles have anything to do with the characteristic test as given above or not, although it seems that they are the probable cause of the coloration, and possibly the factor upon which the reaction depends. Bauman and Herte have found that the sulphates disappear from the urine very early in the poisoning.

The *kidneys* in animals, according to Neumann, are found to be in a state of fatty degeneration. This is contradicted by the results of Salkowski's researches; but Rendu and Patrouillard's case (Case IX.) adds confirmatory proof to Neumann's assertion.

The *venous system* seems to be in a state of general dilatation, and as a consequence the different viscera and glands have been found in various degrees of congestion. The *membranes of the brain* are more frequently spoken of as being congested and full of dark fluid blood, and as an exception have been found natural. The *brain* is generally described as appearing healthy. The *arachnoidean fluid* has been found increased in some cases, and the odour of the acid has been detected in the cranial cavity.

The *lungs* are often described as being congested, and especially so in the most dependent portions. The bronchi have been noted to contain mucus, which may appear bloody or as a dark-red fluid; œdema and emphysema are exceptionally recorded. In at least three instances the lungs have been found healthy; and in one, the left lung was congested and the right emphysematous. A double-pneumonia was developed in Tennent's case (Case XLIII.), which he attributes to the effects of the acid. This is in accord with the statements of Lemaire, who found pneumonia occur in animals thus poisoned.

The *blood* in a vast majority of the cases is found to be dark and fluid, and in exceptional instances to contain soft coagula, and in one was everywhere firmly coagulated. In one case it remained fluid for five days, and in another it became bright red on exposure to the air. The odour of the acid has not unfrequently been detected in the fluid.

The asphyxiated condition, as can be surmised from the results of experimentation on animals, must be due to a paralysis of the pneumogastric apparatus; for it can scarcely be dependent, to any extent, upon changes in the blood disks, because no alterations are revealed by microscopical examination, and besides the blood possesses the power of becoming arterialized when exposed to the air after death (Brabant), which shows that the hæmoglobin was not destroyed, nor its ozonizing power paralyzed. The venous condition of the blood must then be due to a failure of the pneumogastric nerves and centres to properly carry on the respiratory function, and probably in part to the congested condition of the lungs and the depression of the circulation.

There are many difficulties in the way of satisfactorily accounting for the fluid condition of the blood on mere theoretical grounds, because excessive carbonization of this tissue seriously affects its coagulating property; yet, since we are aware of the power of the acid to coagulate albumen, it may be that it exerts some destructive influence on the fibrin-forming proteids.

The smallest *dose* which proved fatal in any of the above cases was one drachm, in a man of 64, and who died in twelve hours; yet two children, one of two and the other of two and a half years, who had each taken the same quantity, recovered. The largest dose taken was by a woman of 35, who drank something less than eight ounces; a half an ounce is almost invariably fatal, yet a case has recovered after the ingestion of four ounces, and another after taking an ounce. The most frequent dose was from a half an ounce to an ounce. Death occurred in nine cases in less than an hour; in one within three minutes, and in four others in less than twenty minutes. Life may be prolonged for twenty-four to forty-eight hours, or longer; but death usually occurs within the first four hours. Death ensued in one case in twenty minutes, from the effects of an enema for ascarides. Davidson (*loc. cit.*) cites a case where seven drops caused alarming symptoms; and in another case, above quoted, five grains elicited well-marked symptoms of poisoning.

The number of fatal cases which have followed the external use of the acid in cutaneous affections, shows that its use, to any considerable extent, in these diseases is not altogether unattended with great danger. Deaths have occurred following its application in cancer of the cervix, and most alarming symptoms have supervened from its use as a lotion in necrosis, or as an injection in abscesses or piles; and we have at least one authenticated case in which death nearly occurred from the inhalation of its fumes.

The experiments of Kempster (*loc. cit.*) on animals, well illustrate the facility with which the pulmonary mucous membrane can absorb this vapour. About one-half of the cases proved fatal when the acid was drunk or used as an enema, while a large percentage recovered in which the poisoning ensued from its local or other use. Cerna (*Phil. Med. Times*, 1879, p. 592) found the minimum fatal dose in rabbits to be fourteen and one-eighth minims per pound, and in dogs eight and four-sevenths minims per pound; certainly a much higher ratio than in man.

The frightful rapidity with which *death* occurs in some cases suggests that it must have been due to shock, such as occurs after the ingestion of sulphuric acid and similar corrosive poisons; but in the other cases where dissolution does not take place for some time it is undoubtedly dependent upon a progressive paralysis of the vital centres. Taylor (*Phila. Med. Times, loc. cit.*) believes that his case probably died from the effects of a paralysis of the pneumogastric and sympathetic nerves which brought about a cessation of function of all the important organs; while others suggest that it may be due to a failure of the heart, asphyxia, or shock. Judging from the symptoms during the poisoning and results of autopsies, there can scarcely be a doubt but that death is usually and directly due to asphyxia or an arrest of the heart or both. In animals the heart is not arrested until the cessation of the respiration, unless the acid be injected into the veins or given in very large quantities; still, there can be no doubt, when the condition of the pulse during life is considered, as well as the strong evidence in the appearance of this organ after death, of the powerful paralyzing action.

The *diagnosis* of carbolic-acid poisoning in most cases should not be attended with difficulty, for the characteristic odour of the drug can generally be detected; and in conjunction with the white or brownish stains about the mouth, and with the most characteristic symptoms as already noted, would almost be conclusive evidence; and, especially so, if the peculiar discoloration of the urine be present. After death the lesions are pretty well defined, and the odour of the acid can generally be distinctly detected in the blood and viscera. The danger of confounding these cases with apoplexy, uræmic coma, and similar conditions must be borne in mind.

The *treatment* pursued was generally such as would be indicated in cases of poisoning by corrosive substances of this nature: emetics, the use of the stomach-pump, olive-oil, milk, eggs, sodium bicarbonate, magnesia, lime-water or chalk, stimulants, counter-irritants, warmth, etc. Bleeding was practised in one case, and as curious and interesting as it may be, the patient recovered. The emetics used were of but little avail, both on account of the inability or difficulty of the patient to swallow, and the disorganized condition of the gastric mucous membrane.

Considering the difficulty of introducing emetics into the stomach, and the disorganization which has taken place in its mucous membrane, it must

be certain that where we have a choice of emetics one should be selected whose action is on the vomiting centres, and which can be used hypodermically—not one which induces emesis by a local irritant action. We cannot hope for much in these cases by using zinc sulphate, mustard, or similar substances, for even if they are gotten into the stomach, the probability is that the mucous coat is so far benumbed or destroyed that it will not respond; while on the other hand, if a centric emetic, such as apomorphine, is injected hypodermically, it will be rapidly absorbed, and the chances of its causing vomiting are infinitely greater than those with the former class.

The administration of the alkalies, especially lime in the form of a saccharate, seems to be founded upon good grounds, for according to Husemann (*loc. cit.*) they possess some antidotal properties. He also found that the oil is probably of no value; yet Lemaire declares when the acid was given with it that its poisonous effects were materially modified. As it is not at all probable that there is any chemical combination whatsoever between the acid and oil, it is likely that the latter merely acts mechanically by preventing a rapid absorption of the acid. On these grounds the oil may be administered quite freely with benefit.

Up to the time of the researches of Baumann and Herte (*Zeitschrift Phys. Chem.* I.) nothing was discovered of any special value as a chemical antidote for carbolic acid, but if the researches of these gentlemen prove to be of the value they seem invested, we have invaluable antidotes in the soluble alkaline sulphates. Baumann believes that when a soluble sulphate is given a *sulpho-carbolate* is formed that is innocuous. My friend, Cerna, found in ten experiments on animals (*Philadelphia Med. Times*, 1879, i. p. 592–597) decided evidences of the efficacy of these salts in this form of poisoning. He first decided the minimum fatal dose in rabbits and dogs, and after determining this point, gave what was deemed a toxic amount of the acid in conjunction with the sodium or magnesium sulphate, and in every instance where they were thus given together the animals recovered; yet, in repeating the experiments in the same animals, after due time had elapsed for recovery, with the same amount of acid, but without the soluble sulphate, fatal results followed; thus clearly proving the antidotal properties. It was then sought to determine if a sulpho-carbolate were formed in the economy, as believed by Baumann; consequently, the acid and solutions of the sulphates were mixed together in different proportions and different strengths, but he could obtain no chemical combination, and therefore doubted if such really takes place in the economy. Yet, until we have more conclusive proof than this, the question must still remain *sub judice*; the fact, moreover, of the disappearance of the sulphates from the urine very strongly intimates that the sulphuric acid is gotten rid of in this way.

ARTICLE X.

THE USE OF HOT WATER IN THE LOCAL TREATMENT OF DISEASES OF THE EYE. By LEARTUS CONNOR, A.M., M.D., of Detroit, Michigan.

IN concluding an article on catarrhal conjunctivitis, in the *St. Louis Courier of Medicine*, June, 1881, Dr. C. E. Michel makes the following remark: "If we ever discover a remedy, which, when externally applied, is perfectly free from irritating properties, while it induces contraction of the walls of the smaller vessels and capillaries of a part, we will then be in possession of an agent which will find its application as a collyrium."

All known astringents he regards as acting as irritants, producing their effects on the muscular fibres of the bloodvessels through their peculiar irritating properties. Hence he regards them as both unsafe and unfit to act as local antiphlogistic remedies. Three years ago we were in the same state of despair, as regards such a remedy to produce local contraction of the smaller bloodvessels of the eyelids. We had faithfully used all the remedies we had seen applied in the best eye-clinics or had read of in books special or otherwise. But the results as observed in the hands of brother practitioners or our own were unsatisfactory.

At that time our attention was specially attracted to the results obtained by the local use of hot water in general surgery and especially in the treatment of various uterine affections. After pondering the matter over our conclusion was thus: If in diseases of the mucous membrane of the female generative organs hot water applied locally does so much good as Emmett and his school declare, why shall it not equally benefit diseases of the mucous membrane of the eyelid? We at once tried its use in diseases of the eyelid with most gratifying results. Then we applied it to the treatment of various diseases of deeper structures, with on the whole very satisfactory effects. For three years our experience in the use of hot water locally applied to the eye in inflammatory affections of its various structures, has constantly, with increasing force, demonstrated to us that as an agent to contract overdistended minute bloodvessels, and to give them tone without producing any ill effect, hot water is the remedy in all cases in which it can be tolerated or employed.

At first we were very cautious in its use, but increasing observation gave us increased confidence. At present we rely upon its uniform action more completely than upon any other one therapeutic agent that we employ.

The gynæcologist tells us that he observes a diminution of the passive congestion, and an increased tone to the mucous membrane and contiguous parts. He claims to be able to effect these results not only in the mucous membrane of the vagina and uterine mucous membrane, but also in all the tissues of the pelvis.

Dr. Emmett tells us that for many years he has been accustomed to employ hot water injections in almost every uterine case coming under his observation either in hospital or private practice. So thoroughly does he believe in the power of hot water to relieve the so-called inflammations of the female pelvic organs, that for over twenty years he has not either employed leeches or scarified the cervix. He does not regard the remedy as a cure-all, but one of the most valuable adjuvants under all circumstances to other means. The general surgeon extols the value of hot water in promoting repair after wounds of any description.

The use of irritants to the conjunctiva for the attempted relief of so many conjunctival affections is based on the theory that by their use an increased amount of blood was induced to flow through the affected part, carrying off the metamorphosis of diseased tissues and promoting the growth of healthy tissues. What, however, shall be said of the effects of these irritants on protoplasmic elements other than those connected with the vascular system. All recognize the fact that these effects are undesirable if not positively harmful.

By the use of hot water we seem to get the contraction of the blood-vessels without other disturbing effects. Any one who has watched the changes in the appearances of a hand long held in very hot water, as in the case of the washerwoman, will remember that speedily the skin becomes white and shrunken. This pale and shrunken condition lasts for a considerable time. In the case of the conjunctiva we have noticed the same effects hundreds of times, and we confidently expect them in every case, unless for some reason it is impossible for the vessels to respond to any stimulus. As a rule, we expect at the second visit to find the conjunctiva much paler and the swelling diminished. Besides, in almost all cases there is a feeling of comfort that discourages the patient to continue the use of the hot water.

In so far as we have been able to determine, it also retards when it does not absolutely stop the escape of the white blood corpuscles from the vessels and thus prevents the formation of pus. It also tends to check the growth of low weak forms of cells and to promote those of a normal kind. In short, its action is both upon the bloodvessels through their nerves and muscles and upon the cell elements in the lymphatics and mucous membrane, etc. etc. While hot water is not a "cure-all," there are few diseases of the eye in which its use does not increase the effects of the other remedies, and in not a few cases it is all the medication that is required. In this respect it follows the same general laws that govern its application in gynecology and general surgery. It should never be forgotten that in the eye we have the same anatomical structures as elsewhere in the body, and that they are governed by the same general laws in physiology, pathology, and therapeutics. The only essential difference consists in the minuteness of structures and complexity of organization, with the corres-

ponding difficulties in making diagnosis and delicacy in applying treatment.

There are few diseases of the eye in which it is not desirable to allay congestion in some part of the organ. And we know of no other local remedy that will accomplish this so safely, so surely, and so speedily as hot water.

How shall hot water be employed?

On the answer to this question hangs the probability of obtaining the results alluded to.

1. The water must be as hot as the patient can comfortably bear with his hand. This temperature will vary with different persons and in different eye-diseases. It is a curious fact that the eye will habitually bear with comfort water at a temperature that is very uncomfortable to the nose, face, and hand applying it. To allay their fears as to the use of very hot water, I usually tell my patients at the first that the nose will be scalded before any harm is done to the eye.

2. The water should be placed in a large vessel, before the patient, on a chair or other support of a height that will readily permit the patient to bend the body upon the hips and the head upon the neck to such an extent as to permit the easy douching the eye by water thrown against it with the whole hand. Neither the hand nor the fingers, nor cloths, nor sponges, should touch the eye. Nothing should touch it but the mass of water thrown by the hand with force sufficient to come into firm contact with the eye.

3. The amount of water in the vessel should be sufficient to maintain the temperature tolerably uniform during the entire douching. I usually direct two quarts.

4. The length of time that the douching is to be continued varies with the tissues to be affected and the degree of the inflammation or irritation. If it be merely a superficial irritation due to some superficial irritant, a couple of minutes three times a day may suffice. In deeper seated inflammations, or in more chronic ones, it may be necessary to apply it for five minutes every hour or half hour. The guide for directions in this respect lies in the effects produced in the vascularity of the tissues. If this can be sufficiently reduced by using hot water for two minutes every four hours, it is both useless and annoying to use it oftener. But if the use of it five minutes every half hour is required in order to produce the same effect, then the less frequent and less prolonged use of the water is equally unsatisfactory. In short, it needs to be used as "opium to quiet pain" in doses sufficient to accomplish the purpose for which it is employed.

To one who has not observed the effects of hot water employed in the manner suggested, there will no doubt be a degree of scepticism concerning the results alluded to. But this will disappear as soon as the remedy is intelligently tried according to directions. Of course it must not be

expected that this remedy alone will cure all eye troubles. We have distinctly stated that only certain definite changes will be produced by it, all other changes require other remedies. While the remedy is a simple one and readily available almost everywhere, I know of none that requires more good sense and more care in its use than the one under consideration. Unless it be thus employed its use will be unsatisfactory. But under no circumstances have I observed any ill results to follow even the most careless or inefficient use of the remedy. But such use has failed to bring about the sought-for results.

As illustrations of some of the classes of cases in which I have found its use of value I give the following condensed reports from my case-book:—

CASE I.—Mr. W., aged thirty-five, a bookkeeper, of nervo-sanguine temperament, married, of good social position, and all the surroundings of a healthy life among the middle classes, came to my notice January, 1879. He complained of pain in and about his eyes, of inability to use them for any great length of time without blurring of vision and a slight discharge of matter in the inner corner of each eye in the morning. A pressure over the sclero-corneal junction produced considerable discomfort. There was injection of the conjunctiva throughout both its ocular and palpebral portions. The iris was contracted and sluggish. An examination with the ophthalmoscope showed a reddened optic papilla, enlarged retinal veins, and a state of congestion throughout the entire fundus. The tension of the eyeball was greater than normal. His general condition was very good. The eyes showed a moderate degree of hypermetropia. Believing that all the symptoms took their origin in the defect of refraction and the attempt to do more work than such eyes would bear, I corrected the defect by giving him a prescription for plus 1-46 and advised him to rest for a few days or longer if possible. Rest he informed me was out of his power without great losses which he could not afford. Besides the prescription for his glasses I ordered a laxative and a nerve tonic. With these he improved somewhat but in the main the symptoms still continued to trouble him. After a couple of weeks he ceased to improve at all. Being still annoyed by the same symptoms in a less degree, I bethought myself of the action of hot water. Hence I advised him take water as hot as his hand would bear and while at his home bathe the eyes, in the manner already described, for a period of five minutes every half hour. The last douching was directed to be taken at least half an hour before leaving the house. At his next visit, he stated that his eyes felt almost well. The hot water had removed the soreness, most of the redness of the conjunctiva, relieved the sensitiveness of the eyeball to pressure. The intra-ocular congestion had also mostly disappeared. Within a period of three days all unpleasant symptoms were gone, not to return to date of writing.

This case illustrates the value of hot water in that large class of cases in which a condition of chronic hyperæmia has been induced in the eye by some defect of refraction, combined or not with a lowered state of the general bodily vigor, or an asthenopic state from any cause which can be or has been removed. The passive congestion remaining after the removal of the cause is in this way pleasantly cured. Indeed I have learned not to wait for the removal of the cause, but to begin at once the use of

the hot water, finding that in this manner the period of treatment is materially shortened, a better result usually attained and the patient rendered far more comfortable.

In all forms of blepharitis the effects of hot water are very striking, especially in its acute forms.

CASE II.—Miss G., aged twenty-five, a kitchen girl, white, of excellent health, consulted me June 1, 1880, for the relief of an acute attack of blepharitis ciliaris. She said that she was frequently subject to these attacks, and that they were a source of great annoyance to her. I found that from time to time she had been under the care of several able oculists. In seeking for the cause of these recurrent attacks I found a condition of astigmatism. This I at once corrected by the appropriate cylindrical lenses. The bowels were regulated and the yellow oxide of hydrargyrum ointment, grs. x to the oz., applied daily to the very roots of the eyelashes, the scales being first removed. Hot water was ordered at intervals of three hours and to be applied for a period of five minutes each time. The relief was most rapid, as the pain, heat, and swelling had mostly disappeared by the second day. The use of the mercury ointment was then stopped and simple cosmoline applied by the patient every night after using the hot water. In two weeks all treatment ceased and the patient had no further trouble with her eyes.

In all cases of blepharitis ciliaris with or without complications, I order the hot water in addition to the remedies usually employed, and the corrections of any defects in the eye or elsewhere that may aid in keeping up the morbid state of the circulation at the edge of the eyelids. At my public clinic it was the occasion of remark among the patients, the students, and such members of the profession as honoured me by their presence, to notice the rapidity with which these cases recovered.

There are a large class of cases of simple conjunctivitis, due to a variety of causes. In all of these I have found no one remedy of so much service as the one under consideration. Of course it does not interfere with other remedies that may be employed. To illustrate:—

CASE III.—Mr. R., aged twenty-two, in general health perfect, but after exposure to the hot rays of the sun reflected from the water during a ride on the river, was taken with pain in the eyelid, smarting of the conjunctiva, overflow of tears, mucus discharge, gradually increasing in thickness until it became muco-purulent, etc. etc. When I examined him two days later, the entire conjunctiva was very red and much of it greatly thickened. The papillæ were greatly enlarged. I at once ordered hot water every hour for a period of five minutes. After each douching of the eyes I ordered to be dropped into the eyes five drops of a saturated solution of boracic acid. Night and morning I applied to the inverted lid an ointment of yellow oxide of hydrargyrum, one grain to the ounce of cosmoline, to the extent of a piece as large as a grain of wheat. A vigorous cathartic was administered and one grain of quinia sulphate every two hours. Immediate relief followed the beginning of the treatment, both as regards the unpleasant symptoms of the patient and the objective appearances of the conjunctiva, and in a few days complete recovery followed.

In granular inflammations of the conjunctiva, acute or chronic, the hot water is invariably a valuable assistance to the other remedies employed. The relief of the congestion of the bloodvessels and the consequent increase of the amount of good blood constantly supplied to the diseased tissues greatly promotes the disappearance of the neoplastic growths. This combined with the yellow oxide of hydrargyrum ointment, in strength varying from one to twenty grains per ounce of cosmoline and a saturated solution of boracic acid, constitute the best combination of local remedies that we have found in the treatment of this obstinate disease. The yellow oxide seems to us to destroy these neoplastic growths called granulations and so to encourage the normal processes of repair. By its action already alluded to, the hot water greatly increases its power. In short it accomplishes objects unattainable by the yellow oxide alone with the same degree of rapidity. At another time we shall give illustrative cases in proof of the foregoing. We regard the hot water as a very important addition to our therapeutics of these diseases.

In all corneal affections I have found the douching by hot water to be followed by relief of pain, the restraint or total arrest of the destructive processes and the promotion of reparative ones. These statements are most readily verified by any one who will only look after the use of the remedy. From the well-known fact that the cornea is supplied with blood at a disadvantage, and that in cases of its disease, danger arises from defective blood supply, it is clear that any remedy that will obviate this danger, will meet a most important indication. Such a remedy is hot water. Hence both theory and actual observation combine to advise the local use of hot water in corneal diseases.

In iritis I have found hot water douching to accelerate the action of the usual remedies and to greatly promote the comfort of the patient. The same remark applies to the deeper inflammations of the eyeball.

After all operations upon the eyeball or its appendages, in which the nature of the wounds or the condition of the patient permit its employment, I never omit the local application of the hot water as the most valuable of all agents for the prevention or relief of inflammation and the promotion of the patient's comfort.

In conclusion we may say—

1. Hot water locally applied has the same power over inflammatory processes in and about the eye as in and about the uterus or any other portion of the body.

2. It has been shown by the late Dr. Pitcher, of Detroit, and by others since his time, that hot water has the power to contract bloodvessels so as to stop hemorrhage and to bring about a more normal state of the local circulation.

3. It is clear that hot water materially limits acute and chronic inflammatory processes, stopping or preventing septic poisoning and suppuration

by its power to destroy or to hold in check the superabundance of white and red blood corpuscles and other protoplasmic elements so numerous at every spot of inflammation or other disturbance of local malnutrition.

4. To accomplish these ends hot water is an invaluable adjuvant to our means for treating all sorts of inflammations of the eye or its appendages.

5. It needs to be applied systematically, as frequently and as hot as is needful to attain the end sought in any particular instance. Further, it must be applied in such a manner as shall not do more harm than good. Thus the use of cloths, sponges, or any similar substance that is brought in direct contact with the eye is likely to set up so much irritation as to largely diminish if not absolutely destroy the good effects of the hot water. The best method that we have found for applying hot water to the eye is to throw it by the handful against the eyeball, taking it from a vessel so situated as to render the act easy and comfortable. At no time should anything but hot water come in contact with the eye. The directions given in the body of this paper more specifically, are such as we have found absolutely essential to obtain any good result, or at least, the very best results.

6. The difficulties in carrying out this treatment are the amount of time and care called for by it. The surgeon who prescribes it must carefully watch that it is carried out exactly as ordered if he expects the indicated results. In most cases he will be materially assisted by the sense of relief from pain and discomfort so generally felt by such as faithfully follow directions.

7. As regards catching cold I generally order that the last douching be taken a half hour before leaving the house by all patients not confined to the house.

8. Used in the manner indicated, to accomplish the ends specified, hot water is an invaluable remedy in the treatment of diseases of the eye. It will accomplish certain indications of treatment more certainly, more safely, more quickly, and more pleasantly than any other single remedy with which we are acquainted.

103 CASS ST., DETROIT.

ARTICLE XI.

A CONSIDERATION OF SOME OF THE MEDICAL AND MEDICO-LEGAL RELATIONS OF SUICIDE, ESPECIALLY IN REGARD TO ITS OCCURRENCE IN THE UNITED STATES. By ROYAL WHITMAN, Interne at McLean Asylum, Somerville, Mass.

THE word suicide in the sense most usually adopted, simply designates the act by which a person kills himself, whatever be the determining

cause, or the means employed to accomplish it. In early times insanity does not appear to have been taken into consideration as a cause of suicide, and hence the various severe laws punishing it as a crime.

The Hebrews treated the bodies of suicides as those of criminals executed by the orders of the judges, in giving them no burial until after sunset.

The Armenian laws ordained that the house in which the suicide had lived should be cursed and burned.

At Thebes, the bodies of suicides were burned, and no mourning or religious ceremonies were allowed at the burial of the body.

The laws of Athens ordained that the hand which had committed the crime should be cut off and burned.

The ancient Roman laws deprived the bodies of suicides of sepulchre. The later Roman laws, favourable to suicide when caused by distaste of life, or by any great sorrow, annulled the wills, and confiscated the goods of criminals who had committed suicide to escape punishment. They also disgraced the memory of soldiers who had committed or had attempted to commit suicide.

The Roman Catholic Church Council which met in the year 452 condemned suicide as a crime, forbidding the honours of sepulchre to those who had killed themselves, unless they repented before death, or were insane.

After the introduction of Christianity, all European countries proscribed suicide under severe penalties.

In England the bodies were thrown into ditches and their goods were confiscated to the profit of the Crown. In the present century the law has been as follows: "By the common law of England a *felo de se* forfeited all chattels, real or personal, which he had in his own right, and his will became void as to personal property. (Blackstone.) To avoid this law, coroners' juries have almost universally returned a verdict of insanity. (Ray, *Medical Jurisprudence of Insanity*, 1871.) The question has been recently decided in England in regard to persons *felo de se*; that freeholds of inheritance of which such persons are seized at the time of their death, do not escheat to the Crown, but pass to the heir-at-law." (Redfield, *Law of Wills*, Boston, 1865.) In France in the twelfth century the goods of the suicide belonged to the lord on whose land the deed had been committed, and the body, having been dragged through the streets on a hurdle, was hung up by the heels and deprived of sepulchre.

This law was modified until in 1551 it was similar to the canonical law. In this form it remained in force until the last century, when Voltaire, Beccaria, and Montesquieu protested against it, accusing it of injustice and barbarism, and the revolution finally abolished it.

Opinions on the subject gradually changed until, in the present century, suicide came to be regarded as a proof of insanity. In support of this

theory pathological investigations were made with a great variety of results. Récamier found thickening of the membranes of the brain; Gall found an increase in thickness of the bones of the skull; Cabanis found an increase in the amount of phosphorus in the brain; while others attributed suicide to various affections of the abdominal organs.

Esquirol, and many other writers of his time, regarded all suicides as insane. "I believe that I have now proved that an individual will only put an end to his life when he is delirious, and that all suicides are mentally diseased." (Esquirol, *Des Mal. mentales*, Paris, 1820.)

"Suicide is an act of delirium." (Dr. Falret, *De l'Hypochondrie et du Suicide*, Paris, 1827.)

Esquirol makes suicide a distinct variety of insanity under the name of *monomanie ou mélancholie* suicide.

Dr. Forbes Winslow, who is almost the only English writer on the subject, regards all suicides as insane, and quotes from Dr. Rowly as follows: "As no rational being will voluntarily give himself pain, or deprive himself of life, which certainly while human beings preserve their senses must be acknowledged evils, it follows that every one who commits suicide is indubitably *non compos mentis*, and is not able to reason justly, but is under the influence of false images of the mind, and therefore suicide should ever be considered as an act of insanity." Winslow finds some difficulty, however, in proving many of the suicides of antiquity insane, as Cato, Brutus, Socrates, Seneca, and others, and concludes that "no inference can logically be applied to the suicides of modern times, as we live under a different dispensation." But he makes his definition of insanity a very broad one, quoting Ellis, who says that lowness of spirits ought to be regarded and treated as insanity.

In speaking of the unjustifiableness of a verdict of *felo de se*, Winslow gives the following rules for coroners who have any doubt as to the insanity of the suicide. "Particular inquiries should be made into the following points:—

"1st. As to the state of mind for some time prior to the act.

"2d. As to the presence of any disease of the stomach or liver which may have operated injuriously on the mind.

"3d. In many cases it will be found that the suicide had received a blow on the head at some period of his life, giving rise to cerebral injury which may have remained latent for a great length of time and then suddenly manifested itself.

"4th. Is insanity, particularly suicidal insanity, in the family? Had his mind been dwelling on the subject of suicide? Was he monomaniacal or remarkable for any peculiar eccentricity? These and many other questions should be carefully sifted if there is any doubt as to the presence of mental disease in such cases."

It is evident that if these rules were followed all suicides would be re-

garded as insane. As for instance : Several Italians of the crew of a vessel which was wrecked near New York last winter, cut their throats to avoid death by drowning, and it is said that certain classes of Italian sailors always carry knives for this purpose, believing that drowning is one of the most painful of all deaths. Such suicides would hardly appear to be the result of insanity, but by these rules they would be classed as such.

“ Reasoning by simple induction, I say that suicide is always a disease, and always an act of insanity. I say, therefore, that it merits neither praise nor blame.” (Dr. Boudin, *Du Suicide considéré comme Maladie*, Paris, 1845.)

Other authors discriminate between the numerous suicides undoubtedly caused by mental disease, and other cases where there is not the slightest evidence of insanity.

Drs. Lisle and Bertrand show that many of the arguments which are brought forward to show that suicide is always the result of insanity would apply equally well to homicide or even to other crimes. They speak of the number of suicides which appear to be the result of reason and discrimination, as to escape punishment or disgrace. (Bertrand, *Traité du Suicide*, Paris, 1857 ; E. Lisle, *Du Suicide*, Paris, 1856.) Griesinger says : “ Whatever certain scientific authorities may assert, we are not warranted in coming to the conclusion that suicide is always a symptom or result of insanity. There is no insanity present when the feeling of disgust with life is in exact relation to the actual circumstances ; where evident moral causes exist which sufficiently account for the act ; where the resolution has been deliberately made and might have been abandoned had the circumstances changed, and in which we discover no other symptom of mental derangement, as when a man prefers death to a miserable, contemptible life. The abhorrence of life, and the idea of self-annihilation correspond to the intensity of the painful impressions which bear upon the individual.” (Dr. Griesinger, Berlin, 1845.)

He concludes, however, that such cases are extremely rare, and that the great majority of suicides are insane.

“ In case of a will contested on the ground of insanity, the only difficulty consists in deciding if a suicidal monomania has or has not been present. This problem is much more difficult because the term suicidal monomania is subject in the general opinion to a very elastic interpretation. Since some consider every individual who kills himself as insane, while others, perhaps with more reason, admit mental alienation as a cause of suicide but in certain cases. Without inquiring abstractly into that which passes in the mind of a suicide in the few moments which immediately precede the act of killing himself, we should consider the motives which have determined the act. These are often so frivolous, so chimerical, that we cannot establish a reasonable relation between their lightness, their

propriety, and the enormous gravity of the act which they determine. For instance, when suicide becomes the means of escaping the scaffold, from infamy, from misery, or even when it is the result of one of these extreme passions, such as love or jealousy, I can conceive that independently of a judgment from a moral or religious point of view, I can conceive, say I, that it can be considered as an act that no insanity has preceded. But when, on the contrary, we see suicides terminate their lives from frivolous and insignificant causes, as where Vatel, the celebrated cook, killed himself because the fish did not arrive in season for a dinner given to Louis XIV., or in the case of a taster of wines, who killed himself because he had been deceived in the quality of a wine, or in the case of the young woman who stabbed herself, 'parce qu'un vent lui avait échappé,' before a numerous assembly: in cases of this class we must conclude that there existed an unhealthy tendency to suicide, involving a pre-existing disturbance of the judgment." (*De la folie, considérée dans ses rapports avec les questions medico judiciaires.* Dr. C. C. H. Mare, Paris, 1850.)

"That sane people commit suicide is a fact that must be apparent to every one who exercises common sense in looking at the subject. The hundreds of poor creatures who are rescued from the Thames, or brought to our general hospitals half poisoned or with throats half cut, are not insane in any medical sense of the term." (Dr. Blanford, London, 1877.)

"Suicide in a great number of cases is the result of mental disease; in other cases it can be considered from the causes which provoke it, and the circumstances which accompany it, as a weakness, a fault, or a crime." (Dr. Leuret, Paris, 1837.)

"If, in the number of suicides, an important part, perhaps one-third, be ascribed to mental disease, perhaps a more important part should be reserved for those individuals in whom one can but suspect a cerebral change escaping our means of investigation, a modification due to hereditary degeneration or to special degeneration of the faculties caused perhaps by excess, or social position. Then there will remain still a third class of individuals, with whom this act often caused by imitation, can no more be attributed to insanity than can any access of anger, and all the states of moral depression which follow the sudden loss of hope, of delusions, &c." (Dr. Le Roy, *Traité du Suicide*, Paris, 1870.)

"Men who see in the actions of men but the necessary results of the physical organization, consider that suicide is always the result of disease, because it is an act contrary to reason, but what crime is not in the same sense contrary to reason? Should we excuse them all as involuntary, as the result of a derangement of the organs of the mind? What will become of morality if it is decided that to kill one's self is always an irresponsible act, and never a crime? Nothing is good or bad, but are equally the result of insanity." (Dr. N. Ebrard, Paris, 1870.)

Du Saulle, in a medico-legal study on wills contested on the ground of insanity, says: "Suicide is not in itself a proof of insanity, and where there is no other reason for thinking a person insane, a will made at the last moment can be and in most cases is valid." (Dr. Legrand Du Saulle, Paris, 1879.)

"Suicide is not conclusive evidence of insanity in respect to a will executed immediately previous to the act." (Wharton, *Medical Jurisprudence*, Phila., 1875.)

"It seems to be abundantly settled by repeated decisions, both in this country and in England, that suicide is no certain evidence of insanity at the time of the act." (Redfield, *Law of Wills*.)

"Suicide is always an unnatural act, but in the large proportion of cases, if not the majority, is committed by sane people." (Dr. Gray, *American Journal of Insanity*, vol. xxxv. No. 5, New York, 1878.)

"That suicide can be committed in a perfectly healthy state of mind cannot, for a moment, be disputed. On the other hand, that the act is, in a large number of instances, the consequence of disease, is equally indisputable." (*Psychological Medicine*, Bucknill & Tuke, Phila. 1879.)

"It has been asked if an exclusive and overpowering passion cannot be considered as a monomania. No. The insane person obeys, as a machine, a motive force of which he cannot combat the power. The man who acts under the influence of passion has commenced by allowing his will to become weakened, and it is his will overborne by passion which throws him into crime. The first obeys an irresistible power. The other could have resisted, but has not wished to do so. In the most delirious paroxysm of passion, man does not cease to have a perception of the good and bad, and of knowing the nature of the acts which he commits. Violent passions brutalize the intelligence, but do not destroy it. They carry the will to extreme resolutions, but do not deceive it by hallucinations, or chimeras. There is not a temporary suspension of the intellectual faculties; man acts under the influence of a sentiment which overcomes him, but he has accepted this domination and acts voluntarily." (Devergie, *Médecine légale*, Paris, 1860.)

It seems evident to me, that suicides who are not insane in any practical sense of the term comprise a large proportion of all those who kill themselves. It seems reasonable to suppose that a materialist believing that death implies annihilation, or even a person with uncertain ideas as to the future state, can easily imagine certain situations where he would prefer death to a life which offers no attractions for him.

The influence of religious belief can be seen in the suicides of India; the religious devotees throwing themselves under the wheels of their idols, believing in their immediate transportation to a happier existence.

The suicides that we read of daily, of defaulters, of men after failures in business, or other projects (it is stated that the suicides at the gambling

resort, Monte Carlo, average three weekly), of disappointed lovers, and of sentimental young people for various causes, real or imaginary, show no evidence of insanity, but rather a moral, or possibly an intellectual weakness, depending in many instances on a faulty education, or on the influences by which the person is surrounded; and it seems very possible that if each person who thought of committing suicide believed that he was to be punished in a future existence for his acts in this world, the number of suicides would be greatly diminished—not only the voluntary, but those which are considered to be the result of insanity.

It is evidently almost impossible to classify suicides correctly—as caused by mental disease or not—and many cases which have been considered voluntary (I use this term to distinguish them from suicides which are the result of mental trouble, and are thus in one sense involuntary or automatic) would on closer examination be classified as involuntary. To illustrate this point: A physician engaged in a large and lucrative practice, and noted for his sagacity in business as well as professional affairs, for more than a year before an unsuccessful attempt at suicide, had a presentiment that he should cut his throat, and on this account did not dare to shave himself for fear that he could not resist the temptation to kill himself. If his attempt had been successful there would have been no evidence to show that he was insane, though immediately after his unsuccessful attempt he developed an attack of acute insanity, and has since been confined in an asylum.

There is generally a marked difference between the sane and insane, with regard to suicide.

If the first attempt of a sane person be unsuccessful, a second is rarely made, or, at least, not for some time; while the insane person, constantly urged-on by delusions, or imaginary voices, often makes the most desperate and continuous attempts to accomplish his purpose.

It has been stated that the mind of the insane person is generally fixed on some particular way of committing suicide, and that he will make use of no other means, even if he has the opportunity. This is often the case; but there are many exceptions. To illustrate: the three most recent cases of suicidal insanity, in an asylum, are as follows:—

CASE I.—This patient, though most carefully watched, night and day, by special attendants, who are locked into a room with him, has, in the space of twenty months, succeeded in making more than thirty-five attempts to commit suicide, by fourteen different methods, viz.: 1, cutting throat, with glass; 2, throwing himself from a height; 3, strangling, with chain of the bath-tub; 4, smothering with pillows, and by inserting his head into the bowl of the water-closet; 5, choking, with peach-stones; 6, hanging; 7, burning; 8, starving; 9, bursting bloodvessels, by holding his nose and straining; 10, eating injurious substances, brick-dust, etc.; 11, masturbation, to weaken himself; 12, retention of urine; 13, dashing his head against various articles; 14, inoculation with cancerous material. This latter method is, I think, an original one. The patient (having previously

scratched his finger), while walking in the garden, broke away from his attendant, and attempted to inoculate himself with the secretion of an epithelioma, from another patient.

CASE II.—This patient, though watched night and day, has made twenty-four attempts, in twenty months, by eleven different methods: 1, drowning, bath-tub; 2, hanging, with suspenders; 3, cutting throat, with broken glass; 4, dashing his head against the wall; 5, choking, with stones; 6, strangling; 7, smothering, with bedclothes; 8, starving; 9, opening bloodvessels, with broken glass; 10, poison; 11, squeezing his testicles.

CASE III.—Has made twelve attempts in about twenty months, by six different methods: 1, poison, verdigris, obtained by placing copper cents in lemon-juice; 2, drowning; 3, eating broken glass; 4, starving; 5, hanging; 6, running scarf-pins into his body in various places.

The question of the criminality of suicide has been discussed by the moralists and philosophers of all times; and they have always been divided on the subject. One part condemned it in an absolute manner; others condemned it in principle, reserving certain cases which they have decided to be justifiable under the circumstances; while a third part claimed it as a right of the human race. Establishing the principle that a wise man can and ought to leave life when it becomes distasteful to him, Pliny considered suicide to be the only consolation of man, and pitied the gods who were immortal. Zeno, Seneca, Stobæus, and Plutarch approved of suicide. Plato, Pythagoras, and Aristotle condemned it. Socrates condemned suicide as the act of a coward deserting his post.

Epictetus condemned equally the immoderate fear or desire of death. He says: "What folly to desire death because you are dissatisfied with life, when it is your manner of living which causes you to desire death! And how ridiculous to invite death when it is the fear of death which has troubled our life!"

Other authors are uncertain as to the morality of suicide, as Marcus Aurelius, Rousseau, and Chateaubriand; while Montaigne and Montesquieu approve of it. "When I am crushed down with grief, with misery, with disdain, why should one wish to prevent me from putting an end to my troubles, to cruelly deprive me of a remedy which is in my own hands? Why should one wish that I should still labour for a society which I despise, that I should still hold to a contract which was made without my consent?" (Montesquieu, *Lettres Persanes*.)

While doctrines of Buddha and Brahma favour suicide, the Koran forbids it: "Do not kill yourself, for God is merciful; whoever shall act thus by iniquity or perverseness shall be consumed by fire." (Sura iv.)

The commandment, "Thou shalt not kill," is generally considered as including suicide, though some authors deny this, and others even go so far as to accuse Jesus of suicide since he might have saved himself if he had so desired.

"Has man the right to kill himself when he thinks that the sum of

his misfortunes has passed beyond that experienced by those about him? A negative response cannot be doubted. 1. It is offensive to our moral sense, to allow to man the right to break the tie which binds him to earth, when he is absolutely ignorant of the purpose for which he has been placed here, and if we examine the question from a less elevated point of view, we must recognize the fact that the suicide involves his family, into the midst of which he brings shame and sorrow, which reacts on each member. 2. He commits a crime against his fellow citizens, and by the same act social disorder, since after having done in this world what has pleased him, man believing that death annuls all engagements would place himself above the justice and morality of all nations." (Le Roy, Paris, 1870.)

There have always been suicides, and examples more or less numerous are to be found in the histories of every country. In Europe suicides were almost unknown during the middle ages, and few examples can be found until after the fifteenth century. Since this time, however, there seems to have been a steady increase.

Complete records of the number and causes of suicide have not been kept until quite recently. These are most complete in France, where they have been kept with great exactness since 1835. Dr. Lisle made a careful study of these records, and his conclusions stated briefly are as follows: That the number of suicides increases every year in France, and in all other countries, out of proportion to the increase of the population. That climates have no influence on suicide. That the greatest number of suicides occur in the spring and summer. That the tendency to suicide increases from infancy to old age. That it is much more frequent among men than among women; 3-4 to 1 of the latter.

Dwelling in cities favours the tendency to suicide. Dr. Lisle then says: "It is not true that education ought to be considered as a preservative against suicide. On the contrary, suicide has increased in direct proportion to the amount of instruction that has been afforded the population, not only in France but in all other countries where inquiries have been made." To support this statement he gave the following table, 1827-34:—

	No. of Scholars to each In- habitant.	No. of Suicides to each In- habitant.	Average No. of Scholars.	Average No. of Suicides.
Boston . . .	1 to 3.5	1 to 12,500	1 to 5.6	1 to 12,644
New York City	1 " 3.9	1 " 7,797		
Prussia . . .	1 " 7.0	1 " 14,400		
Philadelphia .	1 " 8.0	1 " 15,875		
Austria . . .	1 " 13.	1 " 20,900	1 to 132	1 to 30,274
France . . .	1 " 17.	1 " 20,740		
Russia . . .	1 " 36.7	1 " 49,182		

This is obviously unfair, as it compares a few cities of the United States with European countries. This statement that suicide has been more frequent in the United States than in foreign countries has been frequently quoted; but it is entirely incorrect. According to the United

States census the suicides in the year 1850 were 491, or one suicide to 47,233 inhabitants. In 1860 the total suicides were 993, or one suicide to 31,664 inhabitants. In 1870 the number was 1345 or one to 28,666 inhabitants. While the suicides of Europe taken as a whole average about one to 5000 inhabitants.

Of the cities mentioned in the above table for the years 1827-34, Philadelphia, for a corresponding number of years, has at present about the same proportion of suicides that it had then, *i.e.*, about one suicide to from 12,000 to 15,000 inhabitants; while Boston has had for the last seven years about one suicide to 10,000 inhabitants.

The following table shows the suicides in New York City from the year 1803 :—

Average Number of Suicides in New York City.

5 years ending 1808 =	15	{ Average number of inhabitants to each suicide. }	5,468
" " 1813 =	9 $\frac{1}{2}$	" "	10,140
" " 1818 =	13 $\frac{3}{8}$	" "	10,365
" " 1823 =	17 $\frac{1}{2}$	" "	6,327
" " 1828 =	23 $\frac{2}{5}$	" "	7,309
" " 1833 =	28 $\frac{4}{5}$	" "	7,438
" " 1838 =	36	" "	7,463
" " 1843 =	31 $\frac{1}{2}$	" "	10,529
" " 1848 =	26 $\frac{1}{2}$	" "	16,580
" " 1853 =	38 $\frac{3}{5}$	" "	14,695
" " 1858 =	66 $\frac{1}{5}$	" "	10,489
" " 1863 =	50 $\frac{1}{2}$	" "	16,076
" " 1868 =	63 $\frac{1}{5}$	" "	11,185
" " 1873 =	115 $\frac{1}{5}$	" "	8,241
" " 1878 =	155	" "	6,764
For the year 1879 =	117	" "	9,786
" " 1880 =	152	" "	7,938

Suicides in some of the other principal Cities of the United States.

SAN FRANCISCO.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1870	44	1873	59	1876	75	1879	86
1871	45	1874	60	1877	103	1880	90
1872	37	1875	56	1878	90		

For 1880—one suicide to 2589 inhabitants.

ST. LOUIS.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1870	13	1873	22	1876	32	1879	51
1871	13	1874	34	1877	67	1880	57
1872	23	1875	7	1878	59		

For 1880—one suicide to 6325 inhabitants.

BOSTON.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1874	25	1877	39	1879	36
1875	45	1878	34	1880	40
1876	37				

For 1880—one suicide to 9063 inhabitants.

BALTIMORE.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1875	25	1877	16	1879	6
1876	14	1878	16	1880	6

For 1880—one suicide to 55,365 inhabitants.

CHICAGO.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1870	44	1873	55	1876	41	1879	49
1871	28	1874	53	1877	55	1880	63
1872	39	1875	45	1878	52		

For 1880—one suicide to 7743 inhabitants.

BROOKLYN.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1870	28	1873	31	1876	51	1879	37
1871	28	1874	34	1877	50	1880	31
1872	31	1875	39	1878	52		

For 1880—one suicide to 18,280 inhabitants.

PHILADELPHIA.

Year.	Suicides.	Year.	Suicides.	Year.	Suicides.
1870	25	1873	47	1875	68
1871	41	1874	59	1876	60
1872	48				

For 1876—one suicide to 13,759 inhabitants.

Of the 117 suicides in New York City in 1879, but 29 were natives of the United States.

San Francisco is an anomaly among the cities of the United States. The suicides for the year 1880 were 90 (of whom but 32 were natives of the United States), or one to every 2589 of the inhabitants. The suicides in New York City for the same year were 152, or one to 7938 of the inhabitants. The suicides in Paris, which has always been supposed to be the leading city in that respect, for the year 1878 were one suicide to every 2676 of the inhabitants. Thus San Francisco has $2\frac{1}{2}$ times as many suicides as New York, and also excels Paris in this respect. There were also in San Francisco, in 1880, 54 attempts at suicide, which would give a total of 144 successful and unsuccessful attempts at suicide, or one to 1618 of the inhabitants.

Of the total 1345 suicides in the United States in the year 1870, 832 were natives of the United States, while 492 were born in foreign countries. The total native population in 1870 was 33,082,953. The total foreign born population was 5,473,030. Among the natives of the United States there was but one suicide to 39,763 inhabitants; while there was one to 11,124 of the foreign born inhabitants.

Statistics show that though education is much more advanced in the United States than in Europe, yet suicides are much less frequent here than there, and that among the inhabitants of the United States the contrast between the native and foreign born is very striking, not only in

the entire country but in each State also, though the native born are much better educated than the foreign. The United States, therefore, seem to be an exception to the rule which has been so universally quoted, that education increases the tendency to suicide. It seems reasonable enough to admit that a savage whose aspirations are so limited, and whose disappointments are proportionately small, would have little temptation to kill himself. Again, it seems reasonable to suppose that a certain amount of instruction, sufficient, perhaps, to enable a person to read and appreciate the sensational stories of the present day, where suicide generally forms an important part of the plot, in which the suicide of the disappointed lover is extolled as an act of courage, would favour the tendency to suicide; and statistics show that this class furnishes the greatest proportion of suicides; but beyond this point I do not admit the correctness of the rule. I am convinced, on the contrary, that a good education, combined with a common-sense moral and physical training, is the best safeguard against suicide or insanity.

In an article in the *American Journal of Insanity*, vol. xxxiv. No. 4 (Suicide not an Evidence of Insanity, by Hon. O. H. Palmer, of New York), occurs the following: "It was my purpose in the outset to present the statistics of this increasing and appalling crime in our own country; but to my great disappointment I find it impossible. I have looked into the United States census reports, and could give you from them the number of insane and idiotic, the number of deaths by consumption and many other diseases, but not one word as to deaths by suicide. This subject, which I think is one of the greatest importance in vital statistics, seems to have been wholly ignored," etc.

As a contribution towards the literature of this subject, and for the purpose of partially filling this void, I have collected the following otherwise uninteresting tables, chiefly from the census of 1870:—

Suicides.

	Natives of the United States.	Natives of Foreign Countries.	Native inhabitants to each native sui- cide in each State.	Foreign inhabitants in each State to foreign suicide in each State.
Alabama . . .	8	0	123,378	—
Arkansas . . .	4	0	119,831	—
California . . .	30	52	11,680	4,035
Connecticut . . .	18	3	23,545	37,879
Delaware . . .	2	1	56,939	—
Florida . . .	6	1	30,463	4,967
Georgia . . .	14	0	83,784	—
Illinois . . .	46	58	45,754	8,882
Indiana . . .	37	6	41,599	23,579
Iowa . . .	18	18	54,838	11,371
Kansas . . .	10	5	31,600	9,678
Kentucky . . .	16	7	78,600	9,057
Louisiana . . .	7	8	95,055	7,728
Maine . . .	27	2	21,409	24,440
Maryland . . .	10	3	69,748	27,470
Missouri . . .	36	18	41,639	12,348

	Natives of the United States.	Natives of Foreign Countries.	Native inhabitants to each native sui- cide in each State.	Foreign inhabitants in each State to foreign suicide in each State.
Massachusetts . . .	82	23	13,463	15,361
Michigan . . .	21	11	43,621	24,364
Minnesota . . .	4	3	62,277	53,365
Mississippi . . .	9	3	90,746	3,730
Nebraska . . .	5	2	18,449	15,374
Nevada . . .	2	3	11,845	6,267
New Hampshire . .	24	1	12,028	29,611
New Jersey . . .	11	9	65,195	20,993
New York . . .	120	109	27,036	10,443
North Carolina . .	10	0	106,803	—
Ohio . . .	59	37	38,860	10,067
Oregon . . .	2	2	44,661	5,800
Pennsylvania . . .	73	45	40,773	12,117
Rhode Island . . .	5	1	32,391	—
South Carolina . .	5	0	139,506	—
Tennessee . . .	15	3	15,947	6,438
Texas . . .	15	13	50,411	4,800
Vermont . . .	23	2	12,321	23,517
Virginia . . .	14	2	87,529	6,877
West Virginia . .	10	1	42,492	17,091
Wisconsin . . .	25	30	27,606	12,149
Territories . . .	9	9	49,192	10,466

It will be seen that in nearly all the States the proportion of suicides to the inhabitants is much larger among the foreign than among the native population.

Suicides in the United States at each Age. Male and Female.

Ages.	Males.	Females.	Total.	No. of inhabitants at each age to each suicide at corre- sponding age.	Deaths from all causes to deaths from suicide, at each age.
5 to 10 . . .	2	0	2	2,407,356	13,164
10 to 15 . . .	9	3	12	398,849	1,331
15 to 20 . . .	34	32	66	61,221	307
20 to 25 . . .	98	38	136	27,561	191
25 to 30 . . .	102	33	135	24,112	167
30 to 35 . . .	95	42	137	18,707	142
35 to 40 . . .	88	30	118	19,618	170
40 to 45 . . .	116	16	132	14,697	136
45 to 50 . . .	123	27	150	10,533	107
50 to 55 . . .	113	21	134	10,208	120
55 to 60 . . .	65	16	81	10,819	163
60 to 65 . . .	73	10	83	9,384	191
65 to 70 . . .	61	8	69	7,019	209
70 to 75 . . .	33	3	36	9,565	406
75 to 80 . . .	25	2	27	6,507	429
80 to 85 . . .	10	0	10	9,460	959
85 to 90 . . .	5	0	5	6,895	905
Unknown . . .	8	4	12		
	1060	285	1345		

From this table it will be seen that though the most suicides occur at the ages 45 to 50, yet taking the population at each age into consideration, the tendency to suicide is greatest at the ages 75 to 80. Within a few days two suicides at the age of 100 have occurred, which would make the greatest tendency at this age in 1881.

Suicide by each Method in each Month of the Year.

	MALES.													
	Unknown.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Gunshot	19	22	20	27	38	15	15	9	19	13	22	18	237	
Cutting throat.....	11	8	4	10	12	13	8	10	7	9	12	5	109	
Drowning	3	10	5	8	12	9	9	6	5	2	2	5	76	
Hanging	19	24	17	39	54	24	27	26	25	8	24	17	104	
Poison	14	12	14	13	13	9	12	12	10	8	4	7	128	
Not specified	1	17	7	13	23	23	14	20	14	9	16	27	206	
Total—males ...	1	83	83	73	120	152	84	91	77	75	56	91	74	1060

	FEMALES.													
Gunshot	1	4	2	3	...	1	1	1	...	...	1	...	14
Cutting throat.....	5	3	2	6	2	...	3	1	...	1	1	...	24	
Drowning	1	3	1	3	4	9	4	2	4	...	5	3	43	
Hanging	4	3	6	7	13	7	4	3	6	4	3	6	66	
Poison.....	6	7	2	6	15	6	3	9	6	5	6	4	75	
Not specified	10	4	7	5	7	8	6	3	2	4	2	5	63	
Total—females.	1	29	22	22	31	46	26	19	21	14	19	16	19	285
Grand total— males and females }	2	112	105	95	151	198	110	110	98	89	75	107	93	1345

It will be seen that May is the favourite month for suicide both for males and females in the United States, the number being greatly in excess of any other month.

Methods adopted as regards Nationality.

	Unknown.	Natives of the United States.	Natives of foreign countries.	Total.
Gunshot	3	157	91	251
Cutting throat	1	84	48	133
Drowning	3	61	55	119
Hanging	3	267	100	370
Poison	4	123	76	203
Not specified	7	140	122	269
	21	832	492	1345

	Natives of Germany.	Natives of Ireland.	Of all other foreign countries.	Total foreign born suicides.
Gunshot	55	11	25	91
Cutting throat	22	11	15	48
Drowning	28	14	13	55
Hanging	47	23	30	100
Poison	29	14	33	76
Not specified	65	31	26	122
	246	104	142	492

It will be seen that the suicides of the natives of Germany are equal to the total suicides of the natives of all other foreign countries.

Comparative List showing Age, Method, and Sex.

	MALES.																		
	Unknown.	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	Total.
Gunshot .....	..	1	1	11	37	28	28	23	24	24	19	17	11	8	3	2	..	..	237
Cutting throat.....	..	..	..	..	4	5	11	9	11	15	11	11	9	6	7	8	..	2	109
Drowning	2	..	..	3	4	12	8	8	7	8	10	3	3	6	1	1	..	..	76
Hanging	2	1	5	13	21	19	21	14	31	33	38	18	29	25	15	9	7	3	304
Poison.....	1	..	..	4	13	14	14	19	16	14	12	6	5	4	3	2	1	..	128
Not specified.....	3	..	3	3	19	24	13	15	27	29	23	10	16	12	4	3	2	..	206
Total—males... ..	8	2	9	34	98	102	95	88	116	123	113	65	73	61	33	25	10	5	1060

	FEMALES.																		
	Unknown.	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	Total.
Gunshot.....	..	..	..	5	1	1	3	1	1	1	..	..	1	..	..	..	..	..	14
Cutting throat .....	..	..	..	1	3	2	2	5	2	2	2	1	1	1	..	1	1	..	24
Drowning	2	..	1	6	6	1	4	6	3	4	2	6	1	1	..	..	..	..	43
Hanging	1	..	..	..	7	5	7	4	8	8	12	6	2	5	..	..	1	..	66
Poison.....	..	..	2	13	10	13	16	7	..	6	2	..	4	1	..	1	..	..	75
Not specified.....	1	..	..	7	11	11	10	7	2	6	3	3	1	..	..	1	..	..	63
Total—females..	4	..	3	32	38	33	42	30	16	27	21	16	10	8	..	3	2	..	285
Grand total— males and females.... }	12	2	12	66	136	135	137	118	132	150	134	81	83	69	33	28	12	5	1345

From this table it will be seen that the greatest number of female suicides occur at the age of 30-35, while the greatest number of male suicides occur at 45-50, and that hanging is the most common method with men, and poison with women.

ARTICLE XII.

TWO CASES OF PERITONITIS APPARENTLY DUE TO DIPHTHERIA. By WM. C. DABNEY, M.D., of Charlottesville, Virginia.

IN the months of December and January last, there occurred in a large female school in this vicinity an epidemic of measles. The cases were, I learned from the attending physician Dr. Bowcock, generally mild, and all, so far as I know, terminated in recovery.

Following on the heels of the measles there occurred an outbreak of

diphtheria, which, with the exception of two cases, was so mild in character that the disease was not at first recognized, and Dr. Bowcock was not called in.

No cause could be found for the outbreak. It may safely be affirmed that no institution in the country is better managed, and nowhere is more attention paid to the hygienic surroundings of the pupils.

CASE I.—About the 10th of January, Miss M., one of the teachers, about 26 years old, was taken with quite a severe sore-throat, but as there was no diphtheria, so far as known, in this section at the time, no apprehension was felt. She was much better in a few days, and about the 15th her monthly sickness came on. This ceased on the 20th, and on the 22d she came to Charlottesville, a distance of six miles, on the train, and was very busy all day. She returned on the afternoon train much fatigued, and when she reached home she complained of “cramps” in her abdomen, but ate a hearty supper. In the night she suffered so much that she took some laudanum, and the next morning was well enough to be at breakfast.

During the day of the 23d she complained a good deal of pain, but Dr. Bowcock did not see her till the 24th, when he found her with considerable fever, marked tenderness in the lower part of the abdomen, a quick and rather weak pulse, and great nausea. Appropriate remedies were administered, and that night she seemed better, but on the following day, January 25th, he found her with an extremely weak pulse and in a state of collapse. I saw her at Dr. Bowcock's request about 3 o'clock on the afternoon of the 25th, and found her in a state of extreme prostration, pulse almost imperceptible; there was great restlessness and tenderness over the whole abdomen. She sank rapidly and died at 5 o'clock the same evening, consciousness being preserved almost to the last.

We were strongly inclined to attribute the peritonitis in this case to diphtheria, though neither of us had seen or heard of such a case before, nor had Dr. J. S. Davis, of the University of Virginia, who was kind enough to come to our assistance, but who reached the house only a little while before the young lady's death.

CASE II.—On the 5th of February following, I was called by Dr. Bowcock to see Miss O., one of the pupils in the school. She was suffering with diphtheria, and there was marked tenderness and pain in the abdomen especially about the lower part. Her pulse was very feeble, and her temperature high (I cannot recall the exact figure). Full doses of opium were administered and hot applications made to the abdomen.

Dr. Davis was kind enough to see the case with us the next day, and he agreed with us in the diagnosis, and gave, as we had done, an unfavourable prognosis. She threw up on the 6th a good deal of false membrane, and we were informed by one of those in attendance on her that she had passed membrane by the bowels also. The case ran a very similar course to the previous one, and the young lady died on February 7th.

The occurrence of peritonitis as a sequel or complication of diphtheria seems to be extremely rare, if we may judge from the fact that it is alluded to by very few writers on the subject.

In enumerating the different ways in which the disease may cause death

Dr. J. Lewis Smith does not mention peritonitis at all; possibly he may have been familiar with the complication but considered it so rare as to be practically of no moment. Dr. Jacobi, in his recent work on *Diphtheria*, is also silent about peritonitis.

Dr. Wardell, the author of the article on peritonitis in Reynolds's *System of Medicine*, quotes from Abercrombie an account of several cases of peritonitis occurring as a sequel to "diphtheria" which he observed in Edinburgh, in 1824. At the time the throat affection was supposed to be erysipelatous, but later investigations, Dr. Abercrombie states, showed that it was true diphtheria. He remarks on the similarity of the latter affection to erysipelas, and it may be well in this connection to mention that nearly all writers speak of the occasional occurrence of peritonitis as a complication of erysipelas and the eruptive fevers.

My friend, Dr. E. C. Carter of the army, has called my attention to the fact that Hillier in his work on *Diseases of Children*, p. 157, says, "among the rare sequelæ of diphtheria may be mentioned pleurisy, endocarditis, peritonitis, and erysipelas."

I believe it is also referred to by the author of the chapter on peritonitis in Ziemssen's *Cyclopædia*, but Oertel makes no reference to any peritoneal affection further than to say that Buhl in one instance found that "a considerable quantity of free blood had collected in the peritoneal cavity."

In the first case which I have mentioned in this paper we were at a loss at first to account for the peritonitis, though Dr. Bowcock, an unusually well-read and intelligent physician, suggested its probable connection with diphtheria. The diphtheritic attack in this case, however, had apparently terminated several days prior to the occurrence of the peritoneal inflammation, and in the mean time the patient had passed through a menstrual period and been exposed just afterwards to cold and dampness, and had, furthermore, undergone considerable fatigue. There is room, therefore, for doubt as to the directly causative influence of diphtheria.

In the second case I do not think that there can be a reasonable doubt that the peritoneal inflammation was due directly to the diphtheria, and it will be observed that membrane was passed by the bowels and ejected by vomiting during the height of the peritonitis. The young lady previously had been in perfect health, and she had been in no way exposed to cold, etc.; nor had she received any injury which might have produced such a result.

REVIEWS.

ART. XIII.—*Diseases of the Liver.*

1. *On the Bile, Jaundice, and Bilious Diseases.* By J. WICKHAM LEGG, F.R.C.P. London; Assistant Physician to St. Bartholomew's Hospital, and Lecturer on Pathological Anatomy in the Medical School. 8vo. pp. 719. New York: D. Appleton & Co., 1880.
2. *Diseases of the Liver and Portal Vein, being Volume IX. of Ziemssen's Cyclopædia.* New York: William Wood & Co., 1880.
3. *Clinical Lectures on Diseases of the Liver, Jaundice, and Abdominal Dropsy.* By CHARLES MURCHISON, M.D., LL.D., F.R.S. Second edition. New York: William Wood & Co., 1877.
4. *A Clinical Treatise on Diseases of the Liver.* By Dr. THEOD. FRIED. FRERICHS. Two volumes. The New Sydenham Society, London, 1860.

A COMPARISON of the most recent with the older works on the diseases of the liver, placed at the head of this article, will indicate the progress made in our knowledge, not only of the pathological states, but, also, of the functions, of this important organ. If we may interpret Dr. Legg's rather satirical expressions literally, it would not be an anachronism to place amongst these modern authorities the works of Galen, whose knowledge of the biliary functions seems to have been little inferior to our own. Says Dr. Legg, "those who come after us may judge whether the nineteenth century has made any real progress in this matter, compared with the age of Galen." Notwithstanding the temptation to which we are thus exposed, it would be quite impracticable to embrace the works of Galen in the scope of our inquiry. The great treatise of Frerichs, the appearance of which was, in a certain sense, the beginning of a new era in the clinical study of hepatic affections, is a convenient point from which to undertake a review of the subject. It would, indeed, be a labour of supererogation, at this period, to set before our readers an account of this monumental work. The position which we have assigned it, in the course of the historical development of the subject, will probably not be questioned. Murchison's volume, a strictly clinical treatise, is an obvious imitation of Frerich's treatise, which he had translated for the Sydenham Society, but it is, nevertheless, strongly characterized by those qualities which impart to the clinical work of English physicians a peculiar value—conscientious observation, fidelity of description, and a happy faculty of inference, which has almost the force and fruitfulness of original discovery. The volume on diseases of the liver, the ninth of the series constituting Ziemssen's Cyclopædia, is the last to make its appearance, and, therefore, represents the newest phase of German opinion and practice. As this volume is the combined work of Ponfick, Thierfelder, Von Schueppel, and Heller, it may be accepted as a satisfactory exposition of the subject from the standpoint of German thought. But our duty is, more especially, to present to our readers an adequate conception of the work of Dr. Legg; to show how far successful he has been in the account he gives of our present

knowledge, and to what extent he has enlarged the boundaries of our existing information. Dr. Legg must, we fear, be classed rather with the iconoclasts, and, as these terrible medical skeptics usually do, shatters ruthlessly our most treasured notions. But like all idol-breakers, he is more apt at destruction than at building up, so that one peruses his work with a definite sense of the waste of experimental inquiry, devoted with so much assiduity during ages to the elucidation of the hepatic functions. The reader, also, realizes that this ponderous tome, filled with vast and varied learning, is simply a record of mistakes, contradictions, and failures, and that a genuine knowledge of the functions of the liver is yet to be acquired. In the practical part of the work, we pass, it is true, from the domain of experiment and speculation, and find that here, at least, something is definitely known, but the same spirit of pessimism dominates fact, or supposed fact. In a single sentence he disposes of functional hepatic affections, on which Murchison delivered a course of lectures very recently, and which have occupied a large space in humoral pathology, from the time of Galen down. "Now," says Dr. Legg, "if we were to ask modern science what diseases were caused by the bile, all the answer would be jaundice and gall-stones; about any other nothing is known" (p. 662). To estimate with an approach to accuracy the formal opinions of any writer, we must know something of his psychological state, of the influences which have surrounded him and gradually made an impression on his modes of thinking and acting. Especially is this necessary in the case of Dr. Legg, who sums up, it is true, with judicial gravity the knowledge of all times, but his opinions are always coloured by a prevailing pessimism. We find in his book, unconsciously portrayed doubtless, the sources of his skepticism, the inspiration of his iconoclasm. "I am not one of those," he says (p. 664), "much tempted to follow the newest fashion in medicine; or in philosophy, morals, and religion; and still less in names." He tells us in his preface that he "has not fallen into the un-English virtue of consistency," and that "whatever imperfections there may be in the method followed, the reader must blame those Manichaean teachings, which, harmful as they are, are almost as old as the human race itself, and the germs of which seem to exist everywhere, ready to burst into a fresh life, even amongst those who claim to be most orthodox and sincere in their morals and belief." The work is dedicated to Prince Leopold in the usual loyal manner. From these characteristics, we may construct the mental type of the author, as the comparative anatomist does an extinct animal, from a few bones. He is a staunch tory, we doubt not, deeply imbued with the ideas of his class; his temperament melancholic, or bilious, if we may still use the much condemned phrase, and his modes of thinking, therefore, rather gloomy than sanguine. With him the illusions of life go for little, and what is called human knowledge seems to him little more than idle speculation. We must judge of his work, then, by the illumination afforded us in this glimpse of his mental and moral characteristics. But the reader must not suppose that we undervalue the work because we draw a rather unsympathetic picture of the workman. Dr. Legg's treatise is a really great book, exhibiting immense industry and research, and full of valuable information, as we will see, as we advance further in its examination; but we must not lose sight of the type of character producing it. Taking up this work then, in order, we will pass in review the several parts.

Dr. Legg treats only of the bile and the biliary diseases of the liver,

and does not include in his account of the functions of the organ the glycogenic, although constant references to the glycogen become necessary. His account of the chemistry of the bile is very full, and in the consideration of this topic his spirits do not fall so low, since in this respect our knowledge is more complete and exact than in any other connected with the liver. The bile contains certain acids—glycocholic and taurocholic—combined with soda; pigments, bilirubin and derivatives, and fats, chiefly cholesterin. The acids are not the same in all classes of animals, although closely allied. According to Strecker, whose researches are confirmed by Hoppe-Seyler, the nitrogenous bases of the bile acids are always the same—glycocoll and taurin. The acids of the bile are the largest and doubtless the most important of its constituents. Their origin must, therefore, have an important bearing on the question of the sources of the bile. As they cannot be detected in the blood, and have not been, according to the most recent researches, they must be formed in the liver. Next to the acids, the pigment of the bile is a peculiar constituent. Much confusion has arisen from the variety of names given to this colouring matter. Berzelius first entitled it *cholepyrrhin*, Simon *biliphaein*, and Städelér *bilirubin*, which has become the most generally adopted name, and is employed by our author. Bilirubin is converted by oxidation into biliverdin, which is the green pigment of the bile of herbivorous animals, and is also present with bilirubin in human bile. These two pigments are universally admitted to exist, but Städelér asserts that various pigments, named by him *bilifuscin*, *biliprasin*, *bilihumin*, and *bilicyanin*, are also to be found, but thus far he stands alone in this assumption. Various secondary products are obtained from bilirubin by the oxidizing action of nitric acid, which constitutes Gmelin's test. When bile is brought into contact with nitric acid, the yellow colour quickly changes into green, then blue, violet, red, and finally into a dull yellow. When bile is cast up by vomiting, it quickly becomes green by exposure to air, and sometimes this change takes place in the stomach. All of the pigments represented in this play of colours have been isolated. A very important question connected with the bile pigment is, whether it is preformed in the blood, and merely separated by the liver, or constructed in this organ. Opinions differ. Ponfick affirms (p. 9) that bilirubin is found in the blood, and the bile acids alone are produced in the liver. On the other hand, Legg says that the bile pigments are found only in the liver and in the bile (p. 85). It is difficult to account for Ponfick's blunder, since the analyses of Lehmann, of Hoppe-Seyler, and others, afford conclusive evidence that the blood of even the portal vein does not contain a trace of these pigments. The importance of this question is enhanced by the relationship which may exist between the blood colouring matter and the bile pigment—a topic which underlies the subject of hæmatogenic jaundice.

“The relation of the bile pigments to the colouring matters of the blood is that which has the greatest attraction for the physician, inasmuch as much of the doctrine of hæmatogenous jaundice depends upon the belief that the two bodies are the same. Doubtless, the idea that hæmatoidin and bilirubin are identical has much to recommend it to the notice of physiological chemists, but the notion has, I think, been asserted with scarcely sufficient proof. It is, however, an example of the rashness which characterizes the present generation of physiological chemists; they make up for the extreme uncertainty of their opinions by an increased boldness of assertion.”

After an elaborate examination of the rather conflicting observations, Legg concludes that the identity of the two substances is disproved. Both

Kühne and Hoppe-Seyler, however, regard them as identical, and use the terms hæmatoidin and bilirubin as mutually convertible.

Although cholesterin, the principal fat in the bile, is widely distributed throughout the organism, it is probably formed in the liver. Such is the view of Beneke, supported by the chemical examination of Drosdoff, who found four or five times as much cholesterin and lecithin in the blood of the hepatic as of the portal vein. Lecithin is a fatty body containing phosphorus, not unlike Liebreich's protagon, and is a constituent of the bile. Our author is by no means a believer in Flint's doctrine of cholesteræmia. The readers of this Journal need not be told that Dr. Flint, Jr., regards cholesterin as an excrementitious substance entirely, and that it is an important function of the liver to secure its excretion. Flint is by no means without able support of his doctrine. Thus, Beneke holds that the excretion of cholesterin is a function of great necessity to the economy, but he does not go as far as Flint; on the contrary, he maintains that this substance, in company with its congener, lecithin, passes into the intestine with the bile, and is thence widely distributed throughout the body. Flint, however, maintains that cholesterin (he takes no note of lecithin) passes out with the feces, in the form of a substance styled by him *stercorin*. The retention of cholesterin, by reason of the failure of the liver to excrete it, according to Flint, causes cerebral disturbance like that of uræmia, and hence he entitles the complexus of symptoms produced by this retained excretion, *cholesteræmia*. Unfortunately for this theory, it has been found that the injection of a solution of cholesterin into the blood does not cause any disturbance of the system.

In Chapter IV. our author enters with some particularity into the physical and chemical characteristics of human bile. It is but rarely that human bile can be obtained in a fresh state free from any foreign ingredient. Of biliary fistula in dogs, we have had an abundance, but, for obvious reasons, it is very desirable to have an accurate standard of healthy human bile. But a single example of such a fistula in the human subject, free from any source of erroneous interpretation, has been recorded. This was a case of operation for empyema, the escape of pus being followed after some days by bile, which continued to flow for a fortnight, the feces for the same period being colorless. The case was reported by Westphalen, and the bile was examined by Jacobsen and Von Wittich. Legg sums up as follows our present knowledge of the physical and chemical characters of human bile, and as it is an excellent statement of facts, our readers will, no doubt, be pleased to have it placed before them:—

“Freshly secreted bile is a fluid—not viscid, of a golden-yellow, brown, or green colour; its reaction is usually neutral, sometimes barely alkaline; its specific gravity about 1010. It contains about two to three *per cent.* of solid matter, and has the power of changing starch into sugar. This power is lost if the bile remains long in the gall bladder; it then shows a deeper colour, is brown, and is of higher specific gravity, 1030 to 1040, and becomes viscid from the presence of mucus. The amount of solids in this cystic bile varies from eight to seventeen *per cent.*, but the relation of these solid constituents to one another does not seem to vary.

“The soda salts of the bile acids make up about one-half of the solid constituents; they may, however, vary from forty to seventy *per cent.* of the solids. It is known that these bile acids are formed by a combination with glycocholl and taurin, but whether the cholalic acid of man be identical with the cholalic acid of the ox is not known. It is certain that a taurocholic acid exists in the bile of man, although now and then it may be entirely absent, the glycocholic acid

being usually the dominating acid. This forms about three-quarters of the soda salts of the bile acids, while taurocholic acid forms the remaining quarter.

It is known that bilirubin and biliverdin exist in human bile; the other bile pigments have not been found. Their amount has not been directly estimated. With mucus, it is thought to be from ten to fifteen *per cent.* of the solids.

"The fatty matters, the cholestearin, the soaps, and leecithin, make up from three to twenty *per cent.* of the solids. They seem to vary inversely with the amount of inorganic salts. The salts may be from fifteen to thirty-five *per cent.* of the solid bile; and of these salts, about two-thirds are made up of chloride of sodium. The remainder consists of phosphate of soda and lime, carbonate of soda, chloride of potassium, traces of magnesia and silica, and constantly traces of iron and copper. Urea, sugar, leucin, tyrosin, and albumen, are not found in health in human bile."

What is the source of the bile? Is it an excretion, or a secretion? That these questions yet remain for solution, seems extraordinary. An almost incredible amount of research has been devoted to the elucidation of the subject, and our author truly says, the results are so contradictory that we must needs fall back on the general principles of physiology. It has already been pointed out that the bile acids and pigments are not to be found in the blood, and hence the presumption is they must be formed in the liver. But, again, it is now known that these acids and pigments can be detected in minute quantity in normal urine, whence it is concluded that they must have existed in such minute quantity in the blood as to escape detection by our present means of research. But this fact does not obviate the difficulty, for these substances may have entered the circulation from the intestinal canal. As during the existence of jaundice these acids and pigments can be readily found in the blood, it would seem that if they were present in health they could hardly escape detection. Reasoning in this way, it appears conclusive that bile is a secretion, and that it is not merely separated from the blood, as Glisson taught, the liver acting merely as a sieve. Whether the blood of the portal vein or of the hepatic artery furnishes the material for the formation of bile, has been disputed with great persistence. Legg concludes to leave the subject where Bichat left it—that is, to be decided by future investigation, so it would appear that we are no nearer a solution of this problem than they were in Bichat's time. The actual amount of bile secreted can only be approximatively determined. In Westphalen's case of fistula in man, in which bile was discharged externally for two weeks, none apparently appearing in the feces, the daily amount of *solid* bile was about ten grammes, or one hundred and fifty grains. In another case of fistula in man observed by Johannes Ranke, in which admixture of foreign matters with the bile occurred to a greater or less extent, the quantity of *solid* bile was about twice the estimate in Westphalen's case. But this estimate, it is interesting to note, corresponds closely with the amount determined by Bischoff by comparison with results obtained by observations on animals.

The quantity of bile secreted is subject to great fluctuations. It is diminished by fasting; it is increased by taking food. The maximum secretion takes place some hours after food; according to some observers in four, according to others, in eight hours after eating. It seems clear, although there is some contradictory evidence, that more bile is secreted on a nitrogenous diet than on one of fat or of starch. An increase in the blood-pressure raises the production of bile; a diminution in the blood-supply and active muscular movements lessen the quantity of bile. The effect of irritation of the spinal cord, before division of the splanchnics,

seems to be inconsiderable—at first, the flow of bile seems increased, then lessened, but no change takes place, after these nerves have been divided. The very interesting and important fact, first observed by Bernard, that irritation of the orifice of the bile-duct in the duodenum with acid caused a great flow of bile, explains the outpouring of bile which occurs when the acid chyme enters the intestine.

In his chapter on "the office of the bile," Dr. Legg makes some satirical observations on the very contradictory statements which have been put forth by physiologists :—

"After the bile has been poured into the duodenum, and done whatever it is appointed to do, whether it be a positive harm to the process of digestion, a suggestion which in the present state of knowledge may be entertained; or be simply an indifferent fluid; or in some way aid the pancreatic juice; what becomes of the humour? Does it pass entirely out of the body with the feces, or is it absorbed again into the circulation?" (p. 147.)

After a discussion of the changes supposed by modern physiologists to take place in the bile when it reaches the intestine, he again remarks, in a despairing tone :—

"To what purpose then serves the bile? It cannot be looked upon solely as an excrement, for it has been seen what deep changes in nutrition follow its diversion from the body. There is no evidence that it is necessary for the completion of the process of digestion in the stomach or intestines; indeed it may be said by some physiologists that it does harm to the process in either viscus. The view that it acts as a sort of natural purge has little against it, but, at the same time, there is but little in its favour. As to the power of the bile in arresting putrefaction, it would seem that it must be small, if, as soon as it arrives in the intestines, it begins itself to undergo putrefactive changes. The view that the bile neutralizes the acid of the chyme must fall with the establishment of the fact that the bile is not alkaline but neutral in reaction. The only office which remains to it, is that of emulsifying fats, a property known to the Greeks 2200 years ago, and of changing starch into sugar. It is melancholy to find that in so many years nothing more is known with certainty as to the uses of this long-studied humour.

"It has seemed to me that physiologists are drifting into the belief that the office of the bile is not to act upon the chyme or to assist in the first digestion of aliments. Rather its office is to pass into the intestine, there to undergo changes itself, the products of decomposition being absorbed into the blood, and leaving the body by the urine. If it be admitted that the bile acids be decomposed before they be absorbed, it is most probable that they split up into glycocholic, taurin, and cholic acid. The glycocholic, it has been seen above, is one of the bodies which, when taken into the intestine, appears in the urine as urea; taurin, in like manner, appears in the urine, probably furnishing the unoxidized sulphur of this secretion, though, according to Sakowski, it can no longer be thought that in man it is the source of the oxidized bodies, the sulphates. The cholic acid would appear to leave the body by the feces; but a theory might be made by adopting Schiff's view of a circulation of the bile; supposing a salt of cholic acid to be absorbed and conveyed to the liver, and there to unite with freshly-made taurin and glycocholic, and again to be excreted by the bile. Of the destiny of the bile pigments, little has yet been said; by some it is thought they undergo oxidation in the intestines; by others reduction; but the product of the change, whatever it may be, is called by Valair and Masius stereobilin; a pigment which is closely allied to that colouring matter of the urine, named urobilin by Jaffé. It thus becomes possible that the bile pigments after suffering whatever chemical changes they may be destined to undergo in the bowel, are absorbed into the blood and excreted by the urine as colouring matter, while the remainder passes out with the feces. The end of the bile would thus seem to be excretion by the urine; a view not altogether new, for it was taught by physiologists, sixteen hundred years ago, that the urine was formed in the liver and separated by the kidneys." (pp. 155 and 156.)

We have in this extract a specimen of Dr. Legg's style, and of the pessimistic spirit in which he regards the present state of the physiology of the bile. Of his industry in accumulating the so-called facts of physiological chemists, of his candour in expressing his doubts, there can be no question. But he has not entered the field of research for himself to attempt the elucidation of controverted points. It is true, the absurd antivivisection law has almost stopped physiological research in England, and our author, in his preface, acknowledges his obligations to the French authorities for permitting him to use the great laboratory of the veterinary school at Lyons. Yet the researches undertaken were not occupied with these obscure questions in regard to the sources and final disposition of the bile. It will be profitable to inquire, briefly, as time and space are inadequate, if our author, influenced by his dominating skepticism, has not rather underrated what is actually known of the office of the bile in the intestine. May we not here, in view of the contradictory statements, fall back upon certain general principles, as our author recommends under analogous circumstances? Some offices of the bile appear to be well understood. It has an antiseptic effect, and prevents the decomposition of certain foods whilst in the upper part of the small intestine. In this instance physiological experiment is in accord with clinical observation. Who does not know that when bile fails to reach the intestine, the stools are fetid from putrefactive decomposition. Bile assists the pancreatic secretion emulsify the fats, and powerfully aids the passage of "the molecular basis of the chyle" into the lacteals. It has been experimentally proved that oils pass through animal membranes and through plaster, wet with bile, with much greater facility than when wet with water merely. Wistinghausen first demonstrated this, and his experiments have been confirmed and extended by Dr. Williams in this country. Sir Benjamin Brodie, and afterwards Magendie, showed that when bile was diverted from the intestine, by a biliary fistula, fat did not enter the lacteals; except in very small amount, was afterward shown by Bidder and Schmidt. The last-mentioned observers also found that the fat largely escaped absorption and appeared in the stools. All the world knows what Schwann, afterwards Bidder and Schmidt, also ascertained by direct experiment, that when the bile is diverted from the intestine, the nutrition fails remarkably, and death ultimately ensues. Now and then, by the obstruction of the hepatic duct by a calculus, a pathological experiment is effected in man, the conditions of which are the same as when a biliary fistula is made in a dog, and the results as regards the nutrition and the failure of the vital powers are the same. Thus, as respects the disposition of fats, is the bile seen to have an important function. But this is really but a small part of the current knowledge of the hepatic functions.

Dr. Legg does not extend his inquiries to another important function—the glycogenic—although he makes necessarily many important allusions to its connection with the biliary. Since the discovery by Bernard of the glycogenic function of the liver, there have been numerous investigations in regard to the source, nature, and functions of this substance. Have we any exact knowledge on this point? It must be admitted that we have more speculation than actual information, but some things are known of which Galen could hardly have dreamed. Our readers are doubtless familiar with the discussion which has taken place, as to the seat of the production of glycogen, and its relation to, or independence of, the biliary function. Bernard held that the two functions were indepen-

dent, and some of his followers, that certain hepatic cells secrete bile, and others glycogen. Pavy, the English physiologist, maintains that glycogen is found in the liver as a post-mortem change; and Flint, in papers with which our readers must be acquainted, has shown that it is present at the shortest time possible for the most expert operator to obtain a portion of the organ for examination. Recent researches, especially those of Kühne and Heynsius, have proved that the two functions are intimately associated, for if the bile be diverted from the intestine, the glycogen is greatly decreased in amount, or disappears from the organ entirely. New light on the origin and office of glycogen has been cast by late researches of Pavy (*Lancet*, July 2 and 9, 1881), who has shown, contrary to existing belief, that glycogen is not converted to any appreciable extent into sugar in the blood, and that it exists as a normal constituent in that fluid. He finds it very widely distributed throughout the organism—"occupying a parallel position to albumen, viz., existing in the colloid state, and thus adapted for retention within the body, instead of passing off as a diffusible substance like glucose tends to do." Its importance as a ready means of producing force seems to be indicated in these facts, and here we certainly have important light cast on the functions of the liver.

Dr. Legg devotes a chapter (VIII.) to the actions of drugs on the secretion of bile. We find no new observations on these remedies; but he faithfully records the observations which have been made by others, including those on Westphalen's human subject, Scott's, who first studied the effects of supposed cholagogues on dogs with biliary fistula, Rohrig's, the Edinburgh Committee's, and especially Rutherford's. Whilst there are minor exceptions, on the whole there is a remarkable unanimity in the results of these investigations. It can no longer be said, that the effects obtained by experiment on dogs with biliary fistula, are not applicable to man. In Westphalen's case of human biliary fistula (*Deut. Archiv für klin. Med.*, Band xi. p. 598 *et seq.*) a dose of twenty grains of calomel rather decreased the amount of bile discharged. This is the uniform result of the action of purgative mercurials, except corrosive chloride in dogs. Purgatives generally lessen the flow of bile, but the resin-bearing cathartics, as a class, have distinct cholagogue effects, although they vary in the degree of the action. The following list includes the substances having a distinct power to increase the flow of bile:—

" Aloes	Corrosive sublimate
Podophyllin	Muscarine
Rhubarb	Nicotine
Colchicum	Physostigma
Colocynth	Euonymin
Jalap	Sanguinarin
Ipecacuanha	Iridin
Benzoates	Leptandrin
Salicylates	Baptisin
Sulphates of potash and soda	Photolacin
Phosphates of soda and ammonia	Hydrastin
Dilute nitrohydrochloric acid	Juglandin."

In this list we recognize remedies which have long been known to stimulate the hepatic functions, and others are equally conspicuous by their absence. Thus possessed of a group of remedies, which may be justly regarded as cholagogue, the question arises, What will we do with them?

"It has been seen," says our author, "that the wish to increase the amount of bile excreted by the liver comes of a most venerable antiquity; but it may now be asked, in what diseases or in what states would good be done to a patient if the amount of bile poured into the duodenum were increased? It seems to me that it would be judicious to put aside at once all organic diseases of the liver, such as cirrhosis, amyloid degeneration, and the like; for in them the same kind of evil would follow the use of a stimulant to the liver, as of certain diuretics in Bright's disease. . . . Then in cases of jaundice, it would surely be undesirable to attempt to increase the secretion of bile; for the bile passages being already overfilled, harm would be done by pouring fresh bile into them. Then comes the long list of disorders, which the public love to think due to 'the bile,' and called 'biliousness,' the symptoms of which are really due to a catarrhal state of the gastro-duodenal mucous membrane as will be seen in the chapter on bilious disorders."

Our author, indeed, can conceive of no condition in which stimulation of bile-flow may be desirable, except "at the end of an attack of jaundice when the stools have begun to show some appearance of returning colour, but the conjunctiva, skin, and urine of the patient still remain yellow."

As the subjects of biliousness, so-called, and the action of cholagogue medicines, are important practical topics in this country, especially through the west and south, it may be desirable to develop at this point, the real state of scientific opinion on these questions. Dr. Legg devotes the last chapter of his work to "Bilious Diseases," but clearly, this department of the subject has close relation to that which we are at present considering, and may therefore be appropriately taken up now. The existence of bilious diseases, and the belief in biliary derangements, in too little or too great supply of bile, are deeply rooted in the convictions of men, and have been, from the time of Hippocrates, in whose system various kinds of bile played an important part. Bartholin was the first of the modern school to dispute the Galenical views. But, as has been pointed out, the reaction has gone in the opposite direction, and now various conditions of the bile are, in common professional and popular belief, influential agents in disease production. The swing of the pendulum of professional beliefs is again starting away from this point, and the "bilious state," and "biliousness," are strongly doubted as morbid entities by the new school of physiological physicians. Frerichs treats of hyperæmia of the liver due to gastro-intestinal catarrh, but we do not find in his work any references to the functional disturbances of the liver such as in England and in this country are supposed to exist under the term biliousness. Murchison, in his very suggestive and interesting Croonian lectures, holds to the belief in such derangements. A large portion of the physicians in this country, especially those practising in malarious regions, are unquestionable believers in biliousness, as a distinct morbid state. Our author, Dr. Legg, maintains, that "there is no evidence that the disease is accompanied by any increase or decrease, or any change whatever, in the secretion of the bile." His view, that the condition is really gastro-duodenal catarrh, is probably correct in large part; but not every case of this kind is accompanied by a muddy complexion, yellowness of the sclerotic, and light-coloured stools, indicating biliary derangement. There are two forms of the condition, then—one limited to the gastro-duodenal mucous membrane; the other, accompanied by signs of biliary derangement, and therefore, doubtless, extending to and involving the orifice of the *ductus communis choledochus*. In the latter sufficient swelling of the mucous membrane about the orifice of the duct exists, to hinder, to a greater or less extent, the escape of bile into the duodenum, although not to prevent

it entirely. During many years of practice in malarious localities, the reviewer saw numerous examples of this form of gastro-duodenal catarrh, or biliousness. When, in such cases, the whole tract of the hepatic duct is involved, we have the well-known catarrhal jaundice, which, for obvious reasons, is much less apt to occur than catarrh limited to the duodenum. By Murchison (p. 565) symptoms of the same kind are referred to *lithæmia*, that is, imperfect oxidation, the accumulation of uric acid and urates in the blood, and their excretion by the urine. Murchison admits that "these symptoms are the more likely to occur if the patient be what is commonly known as a 'generous liver,' if he takes little exercise in the open air, or if he have much mental work." The complexus of symptoms, given by him, are those of gastro-duodenal catarrh, and he enumerates amongst them, weight at the epigastrium, flatulence, heart-burn, a furred tongue, metallic taste, headache, change in the colour of the stools, etc. It can scarcely be doubted that Murchison has ascribed to lithæmia the symptoms belonging to gastro-duodenal catarrh, and that he confounds effects with causes. The final conversion of nitrogenous materials into urea, is the work of the liver, it is true, probably, but when gastro-duodenal catarrh exists, the peptones are imperfectly prepared, and here is the first step in the morbid process.

In determining the bilious state, much assistance is usually afforded by an inspection of the stools, but all modern authorities are agreed that this information may be very misleading. Legg says:—

"To tell the truth, very little knowledge exists as to the cause of the colour of the feces, either in health or in disease. It is indeed known that a few drugs, such as iron or bismuth, blacken the stools, and that complete obstruction to the common duct will cause them to become clay-coloured; but the other causes of the varying colours remain almost unknown. The only proposition that can be safely upheld is, that bile is not the sole cause of all the change in colour." (p. 661.)

As far as the condition of biliousness is concerned, the change in the colour of the stools is eminently characteristic and can be referred to the absence of bile.

Next to the belief in the existence of biliousness as a distinct morbid state, is the conviction of a large portion of the medical profession in Great Britain and this country, that mercurials, particularly blue pill and calomel, are especially effective in removing it, and restoring the normal. No point in therapeutics has been more fully discussed, and, hence, it deserves careful consideration at our hands. The evidence that calomel and blue pill do not increase but diminish the secretion of bile, has already been placed before the reader. But two facts directly bearing on the question at issue, are now well-established: the stools are changed in character by mercurials; the symptoms of biliousness, or gastro-duodenal catarrh, disappear under their use. If these remedies, then, do not act on the liver, how explain their good effects? We believe, and have of late years taught, that the explanation is as follows: The colour and odour of the stools begin to have their usual characteristics in the lower part of the ileum and especially in the cæcum. Mercury increases the activity of, and is largely eliminated by, the enormous glandular apparatus of the ileum and cæcum, and to this action is to be referred the change in the colour of the stools. Small doses of calomel ($\frac{1}{2}$ to $\frac{1}{4}$ grain) have a remarkably sedative effect on the gastro-intestinal mucous membrane, just as powdered calomel will allay an inflammation of the conjunctiva. Other

remedies act favourably—the salines for example—and all the world knows the good effects of a rigid diet and of abstinence. Since his demonstration of the cholagogue action of euonymin, Rutherford speaks strongly in behalf of a dose of this substance at bedtime and followed by a saline in the morning.

As “bilious” is a misleading term, Legg urges that its use be discontinued. (p. 663.)

In Chapter IX., Dr. Legg gives an interesting account of the physiological action of the bile, in the course of which he introduces a good deal of experimental evidence. This is a comparatively recent subject. Frerichs, in an appendix to his work, records the results of various experiments, but great progress has been made since in the knowledge of the physiological action of the bile. Röhrig, Kühne, Hünefeld, Traube, and many others, have contributed facts. As the effects of the bile, studied physiologically, serve to illuminate various points in hepatic pathology, and have therefore an immediate practical application, it may be desirable to summarize the ascertained facts. Bile exerts a solvent action on the red blood-corpuscles, but this result is due to the bile acids and not to the pigments. Muscles lose their contractility when acted on directly by the bile acids, but this effect is chemical, and does not occur when they are acted on through the blood. It is well known that the pulse of jaundice is slow, and much experimental work has been done to prove the cause. By Traube and Ranke this effect was attributed to the action on the muscular tissue, and by Röhrig, on the ganglia of the heart. The conclusion of Röhrig has since been confirmed by the experiments of Steiner and of Legg. As regards the influence of the bile acids on the blood pressure, much depends on the vessel into which they are introduced; when injected into the jugular vein, the pressure falls, and when injected into the carotid artery the pressure rises. No conclusions can be safely drawn from such observations. The temperature is decidedly reduced by the bile acids. On the brain, they act as a narcotic, causing drowsiness and stupor, and they lower the reflex function of the spinal cord. The cerebral effects caused by the bile acids should be carefully distinguished from the symptoms due to thrombosis of the pulmonary artery when the bile acids are thrown into the jugular vein. The bile pigments seem to be physiologically inert.

Thus far we have been occupied with topics which merely prepare the way for the consideration of hepatic diseases. Much of this has been physiological and speculative, yet we will find at all points that the obscure problems waiting for solution are closely connected with the most practical questions.

Frerichs, as is well known, opens up the subject of liver diseases by discussing jaundice as a symptom. Dr. Legg approaches the subject in the same way, and in Chapter X. discusses the etymology, history, and etiology of jaundice. Jaundice may depend on several conditions. In the first place, it has been assumed that it may be produced in the blood by changes in the colouring matter—hæmatogenous jaundice—as for example, the jaundice in pyæmia and putrid fevers. According to one view, the liver merely separates the bile from the blood, and hence jaundice may be produced when the organ can no longer perform this office. The third, and most generally accepted view is that which ascribes jaundice to the absorption into the blood of bile previously formed by the liver. The subject of hæmatogenous jaundice possesses a high degree of interest.

Although not wholly a modern theory, Virchow may be regarded as its real founder. There are many reasons for a belief in the existence of this form of jaundice, chief among them being the close resemblance of hæmatoidin and bilirubin. As is usual, physiological chemists of equal eminence, differ as to the identity or resemblance of these substances. Virchow, Funke, Valentiner, and some others, maintain that in crystalline form and in reaction, the two bodies are the same, but, on the other side, Strädeler, Preyer, Holm, and others, affirm that they differ in these respects, and especially in their spectra, which are widely apart. If there be an identity in composition and structure between hæmatoidin and bile-pigment, the introduction of any agent into the blood which would set free its colouring matter, must result in the production of jaundice. This has not been accomplished. Various agents set free the hæmoglobin, but jaundice has not followed, although the bile-pigments, it is said, appear in the urine. But this point is also disputed. Frerichs, Kühne, Munk and Leyden, found that the bile-pigments were present in the urine, but J. Steiner and Legg were unable to detect them under the same circumstances. The confusion is probably due to the fact that the blood-pigment reacts in a similar manner to bile-pigment, and still more, to the fact that in dog's urine there is normally present a substance which reacts in the same manner as bile-pigment. After a careful survey of all the evidence, our author concludes as follows:—

“The grounds on which the theory of hæmatogenous jaundice have been set up are, to my mind, altogether insufficient. It cannot be said that the origin of the colouring matter of the bile, from that of the blood, is proved; indeed, of late, the course of discovery has been rather against their identity than in favour of it. And until it has been shown that bile pigment has its source in the blood-corpuscles, it will be the duty of the practical physician to reject the theory of hæmatogenous jaundice.”

Frerichs came to similar conclusions twenty-five years ago, and urged similar reasons for rejecting this theory.

“As regards the spontaneous conversion of the red matter of the blood into bile pigment in putrid diseases, no objection can be made to the possibility of such an event, considering the intimate relations which have been shown to exist between hæmatine and cholepyrin [bilirubin]; but positive proofs of it are wanting. As yet no one has succeeded in manufacturing bile pigment from the red colouring matter of the blood, although the products of decomposition of both are the same. The yellow matter, however, which in cases of pyæmia circulates with the blood, and is voided in the urine, is at least in most cases identical with bile pigment, and participates in all the properties of this substance. But even were the conversion of hæmatine into bilirubin, under the operation of certain agencies possible, still it remains to be proved that this metamorphosis really takes place in the course of putrid diseases within the bloodvessels of the living body.” (Vol. i. p. 84.)

The labours of twenty-five years have, therefore, not cleared up the doubts; only it may with justice be said that the great mass of experimental inquiry has not been wholly in vain, since the doubts regarding the existence of hæmatogenous jaundice have increased. The results of physiological research have, however, not been so barren in that form of jaundice known as jaundice by suppression. It has been held, quite down into our own times, by Bamberger, Trousseau, Budd, and more recently by Moxon (*Transactions of the Pathological Society of London*, vol. xxiv. p. 133 *et seq.*), that the bile is formed in the blood, and merely strained off by the liver; hence, jaundice results when the liver is inca-

pacitated from the performance of this function. We have already given the experimental data which negative this theory. Neither the bile acids nor the bile pigments have been found in the blood, not even the blood of the portal vein. The third theory of jaundice is that which supposes an absorption into the blood of bile already secreted by the liver, some obstacle existing to prevent the passage of the bile into the intestine. This theory best harmonizes all the facts, and is now universally admitted to be true.

Very little obstruction suffices to pass the bile into the blood, rather than into the duodenum. It is not necessary that the duct be closed; if there be some swelling of the mucous membrane so that the flow of bile is impeded, it is sufficient to start the flow into the blood. From this fact we get a clear understanding of the varying degrees in which with gastroduodenal catarrh there may be implication of the biliary function. Jaundice may also be caused by a considerable diminution in the pressure of the bloodvessels of the liver. Frerichs advocates this theory. It is assumed that the bile passes in the direction of least resistance, which will be towards the vessels, when the blood-pressure is low. This fact has been experimentally shown by Heidenhain, and such is the mode of explaining the jaundice caused by mental emotion, by bites of serpents, and by loss of blood.

In Chapter XI. our author treats of the symptoms of jaundice, and in Chapter XII. of the complications. We pass over these, although full of interesting matter and rich in suggestion, except to mention merely that he gives an excellent account of Xanthelasma, illustrated by a beautiful chromo-lithograph. In Chapter XIII., on the morbid anatomy of jaundice, we find several subjects of recent development, which have an important bearing on practice. We should not fail to direct the attention of our readers to these points. We refer to the histological changes which take place in the liver consecutive to obstruction of the ducts. These changes have been studied by Charcot, and by Legg (the latter is, we believe, entitled to priority), by experiments on animals, as well as by observations on man. Before Legg's special studies were undertaken, Oskar Wyss had, however, distinctly referred to the changes which take place in the interlobular connective tissue (*Virchow's Archiv*, Band 35, p. 553; *Beitrag zur Histologie der icterischen Leber*). Dr. Legg, with characteristic fidelity, refers to these observations, and assigns them their proper position, notwithstanding they barely relate to changes which he has laboriously described. There is, doubtless, some amiable sarcasm hidden in the following paragraph:—

“The histological changes of the liver in obstruction to the duct had been until lately but little studied, though at Paris we are told that within the last three years the subject has become the order of the day. This is no doubt owing to the experiments of Charcot on this point, which have everywhere drawn much attention.”

Catarrh and dilatation, to a greater or less extent, of the ducts, pigmentation of the liver, and jaundice of the hepatic cells, have of course been pretty thoroughly described. As regards the changes of the connective tissue, its overgrowth and the consequent hypertrophic thickening and enlargement of the organ, caused by obstruction of the bile ducts, we owe the first important studies to Dr. Legg, who was soon followed by Charcot in the same vein. These changes may be but trivial in temporary obstruction of the ducts, but in long-standing cases they become consider-

able. Dr. Legg finds that in dogs, whose common duct is tied, the overgrowth of connective tissues goes on rapidly, and attains extensive proportions. The explanations which have thus far been brought forward of this hyperplasia have not been satisfactory.

The changes caused by obstruction are not limited to the connective tissue. The hepatic cells participate. Leyden describes fatty infiltration of the cells, and his statements are confirmed by Hayem and Cornil. Wyss, Meyer, Legg, Charcot and Gombault find that this fatty infiltration is not constant, and not so extensive as Leyden supposed. The cells waste and become granular, the protoplasm gradually disappears, and sometimes they have a shining, vitreous appearance. When the obstruction is permanent the cells may completely disappear, and are replaced by a granular and fatty detritus.

Although the mechanism by which these changes are wrought remains unexplained, the facts themselves have a high degree of clinical significance. We see in these histological changes an imperious necessity for the prompt removal of the causes of obstruction whenever it is practicable to do so. We learn further how successive attacks of duodenal catarrh, with swelling of the orifice of the common ducts (the simplest cause of obstruction) will, in time, bring about serious changes in the hepatic structures.

Characteristic alterations also occur in the kidneys in cases of jaundice. Legg finds that nothing can be added to the accurate account given by Frerichs. Besides the straining of the organ in various degrees, the epithelium of the tubercles is filled with pigment, and undergoes fatty degeneration.

In Chapter XIV., on the functions of the liver in jaundice, Dr. Legg introduces much valuable matter, which brings into sharp contrast the author's pessimism, and the appreciation of the rich results obtained by modern investigations. Dr. Legg considers in order the disturbing influence of jaundice over the hepatic functions, beginning with the glycogenic. This he regards as the most important of the functions. It is lessened in activity, or entirely arrested when the ducts are obstructed.

"In all cases I found that whether the animal died within a few hours or a few days after ligation of the bile ducts, in all cases alike, glycogen was absent from the liver."

He is habitually cautious in applying the results of observations on animals to the conditions in man.

"It becomes a question how far this fact in animals may be applied to jaundice in man, when there is sometimes evidence from the presence of colour in the stools that the obstruction to the duct is not complete. In these and other cases the phenomena seem best explained by supposing that the glycogenetic function of the liver is not altogether abolished, but rather impaired. Even in cases of simple jaundice the patient wastes and loses flesh rapidly, and this seems best explained by supposing a great impairment, if not destruction, of the glycogenetic function. Glycogen is always found in growing parts, and its importance to nutrition cannot be doubted."

It has already been shown that there is an intimate relation between the biliary and glycogenic functions—that they are interdependent. The presence of bile is necessary to the production of glycogen. As it has been shown that in jaundice the diminution in the production of glycogen is in proportion to the extent of damage suffered by the liver, so also in the same ratio does the bile-producing function of this organ undergo

abatement. The quantity of bile acids and of pigment excreted by the urine is greatly below the production in health. The reason is, there is much less formed. After a time the jaundice may cease simply because the liver is unable to produce any more bile.

Another function of the liver impaired in jaundice is the heat function. Claude Bernard first demonstrated the important fact that the temperature of the blood in the hepatic veins is higher than in any other part of the body. The great production of heat is unquestionably due to the active chemical processes connected with the formation of glycogen and of bile. It necessarily follows, if these two functions are lessened in activity, or suspended entirely, the heat produced must be less. This view is confirmed by the well-known clinical fact that in jaundice the temperature is subnormal.

Our author, notwithstanding the pessimistic view he takes of the progress of knowledge in respect to hepatic physiology, admits the existence of a fourth function—that of sanguification. The blood of the hepatic vein contains very little fibrin, and will hardly form a clot; it contains a relatively larger proportion of red and colourless corpuscles, and the extractives and fats are present in greater quantity than are found in the portal. As in jaundice the relative proportion of red corpuscles is much decreased, this result may be ascribed to the interference with the process of sanguification, which occurs when the liver is diseased.

Passing over the diagnosis and prognosis of jaundice, which are the topics of Chapter XV., we come to the treatment of jaundice, which occupies Chapter XVI. In this chapter Dr. Legg's iconoclastic spirit has abundant opportunity. After giving an account of the method of treating jaundice, which he calls "rational," he deals some destructive blows against the "empirical treatment." His method, in brief, consists in a careful regulation of the diet, excluding fats, starch, and sugar; in the administration of the milder preparations of iron to remove the anæmia; in the use of salines and alkaline mineral waters, to increase elimination by the kidneys; and in attention to the skin, to maintain its functions. That this method of treating the most usual form of jaundice—the catarrhal—is *rational*, we fully believe. That it will yield equally valuable results in other forms of jaundice, we doubt. Dr. Legg condemns the use of purgatives, except a dose or two to remove constipation, and includes in his anathema calomel, and the so-called cholagogues of vegetable origin. He can see no good in remedies which stimulate the hepatic functions when there exists an obstacle to the escape of bile, or when disease has attacked the organ itself. In the present state of knowledge, these reasons certainly seem to be conclusive. He is equally opposed to the use of emetics, but has a friendly word for the mineral acids, because, probably, a rational explanation of their utility has been given in the experiment of Bernard, who found that the application of an acid to the orifice of the common duct in the intestine caused an active pouring out of bile.

From jaundice, a symptom, Dr. Legg passes to the diseases of the liver, beginning in Chapter XVII. with *icterus simplex*. This he defines to be a self-limited disease, of two or three weeks' duration, always terminating in recovery. In the discussion of the causes, he expresses doubts, as might be expected, in regard to the influence of emotional excitement. The historical examples of jaundice caused by anger, fear, sudden joy, and other mental and moral emotions, he thinks may be explained on other grounds. He does not at all allude to the influence of malarial in-

fection. That simple jaundice, without febrile disturbance, is caused by the imbibition of malaria in some subjects, is a fact, which any one who has practised in the intensely malarious localities of the Mississippi Valley will substantiate. In certain other subjects, malarial infection will induce chronic splenitis (ague cake); also, without the objective phenomena of fever, and as the sole evidence of malarial toxæmia. Legg admits, with Frerichs, that in a considerable portion of cases the real cause of the jaundice is catarrh of the bile ducts, originating often, probably most frequently, in gastro-duodenal catarrh. In malarious regions, again, this morbid state is very common. But the paludal poison is not the sole factor in its causation. Gastro-duodenal catarrh is a result of excesses at table, especially in the use of highly-seasoned and rich dishes, and it is readily produced by the habitual indulgence in spirituous and malt liquors. We have already pointed out that biliousness, from the simplest case of indigestion so called, up to fully-developed jaundice, may, and does usually, depend on gastro-duodenal catarrh causing more or less obstruction against the escape of bile into the intestine.

The importance of catarrhal swelling of the mucous membrane, or blocking of ducts by mucous plugs, has been recognized from Van Swieten down. Among moderns, Virchow has done most to demonstrate the existence of catarrhal jaundice. Dr. Legg comes to the conclusion "that a catarrh is a common cause of jaundice, cannot, I think, be disputed; but that it is the cause of all cases of simple jaundice still lacks proof; a difficulty not likely to be overcome soon, as opportunity for examination after death is so rare." We venture to add, that this cause will be found in action in all cases of simple jaundice, although other factors may have a determining influence.

Simple icterus sometimes prevails as an epidemic, under circumstances usually indicating the presence of poisons generated by decomposing vegetable and animal matters. When uncomplicated it does not differ from the sporadic form.

The most interesting disease in the group of hepatic disorders, considered from the point of view of the disputed functions of the organ, is acute yellow atrophy. This disease is a pathological vivisection, in which the organ is summarily removed from its associated organs. The widespread confusion which then results affords us a conception of the place occupied by the liver in the system of man. This disease is, therefore, deserving of the exhaustive examination given to it by our author, who devotes to it 140 pages, or one-fourth of his work.

As is his custom, Dr. Legg, who is fond of philological disquisitions, first discusses the name, and the synonyms in various languages. He does not approve, strangely enough, of the name proposed by Prof. H. C. Wood, M.D., in an article in this Journal (vol. liii. p. 418), viz., *leucinosi*, because leucine is found in the blood in this disease, and he remarks, rather irreverently, "I am glad to find that in this he has no follower."

"Acute yellow atrophy is one of the rarest diseases known to man." There is good reason for believing that some of the reported cases were examples of phosphorus poisoning. This has seemed probable, since in undoubted cases of phosphorus poisoning, the chemists have been unable to detect this substance in the bodies of the dead. A heated controversy has been going on in Germany over this question. "Liebermeister and Ossikowszky assert that no distinction can be drawn between acute yellow atrophy, phosphorus poisoning, and yellow fever; Schultzen and Riess

and Winiwarter declare that there exist certain means, both before and after death, for distinguishing between them." There must be an extraordinary similarity, nevertheless—a fact of high interest from the point of view of causes of this singular malady. This fact is of great importance in another aspect. Phosphorus is much and freely prescribed in medical practice, and children have a strange *penchant* for eating matches—whence the question of yellow atrophy or phosphorus poisoning might arise. The statistics of Frerichs and those collected by Legg, prove that the female sex is more liable to this disease than the male. In 100 cases collected by Legg, there were 69 women or girls. Thierfelder says there are "fully one-half as many more cases amongst women than amongst males." The period in life most liable is from 15 to 30. All concede that pregnancy is the most important predisposing cause, the greatest number of cases occurring in the sixth month. A local and family predisposition has been noted, also. That a peculiar poison generated under conditions and in a form now not known, is the real pathogenetic factor, seems highly probable, in view of the history and behaviour of the disease; still more because of the production of a precisely similar malady by phosphorus. Interesting as it may be to pursue this topic, we must rather devote our attention to this disease as a means of casting a much needed illumination on the functions of the liver. We have already stated that it may be regarded as a pathological vivisection. We must now form an adequate conception of the kind and degree of damage sustained by the organ, and compare the changed with the normal functions. Unfortunately for the deductions to be made as to the part enacted by the liver, this disease is a general disorder, in which the liver suffers in common with many other organs, but in a more complete degree than any other. The liver becomes small, flaccid, yellow, and fatty. Through the yellow are scattered islets of red tissue, firmer and tougher, and apparently more shrunken. In an advanced state of the disease, the hepatic cells entirely disappear, only granular detritus marking their site. During the progress of the changes, the cells become fatty, and, at the outset, before the liver has wasted or even changed materially in its appearance, the microscope must be invoked to make the diagnosis. Whether a hyperplasia of the connective tissue of the liver also occurs, is warmly disputed, the weight of authority being in favour of the position that an increase does take place, when sufficient time is afforded. The muscular tissue of the heart, the renal epithelium, and other organs and tissues undergo a similar granular and fatty degeneration. Without commenting on the obvious disturbances in the functions of the other organs, we consider the changes which ensue by reason of the cessation of the hepatic functions. If the disease is not advanced, some bile may still flow into the intestines, but in a great majority of the cases, Legg, as all other authorities, states that the stools are grayish or clay-coloured; or they may become tarry or blackish, says Frerichs, from admixture with blood. Thierfelder makes the same statement, although he admits that "occasionally" they may be bilious. Here, indeed, Dr. Legg expresses an opinion in conformity to common experience, but at variance with his earlier observations, on which we have commented, namely, that the stools afford no indication of the presence or absence of bile. As the disease is of short duration, all of the bile produced flows into the blood, and the jaundice persists until death. If the disease were more protracted, and the liver suffered the same damage, there would come a time when the jaundice must cease, for, the bile being no longer produced and the kidneys

continuing to excrete it, all would disappear. The excretion of bile pigment must, however, be slow, in a disease in which the renal tubular epithelium is so quickly disintegrated. The conclusion which physiological chemists have, provisionally, at least, reached in regard to the bile acids, is that they are split up in the intestines into glycocoll, taurin, and cholic acid; the glycocoll is excreted by the urine as urea, and the taurin, also, finds exit in the urine as an unoxidized sulphur compound, whilst the cholic acid is discharged with the feces. All of this is changed in acute yellow atrophy. We owe to Frerichs the remarkable fact that the urea is greatly diminished, and sometimes entirely disappears from the urine in this disease. It is true there are some contradictory observations, but on the whole it seems clear that although urea may be present it is much less in amount than in the normal. Intermediate in the process of tissue metamorphosis are leucin and tyrosin, supposed to be steps in the transformation of albuminous substances into urea. We owe also to Frerichs the demonstration of the fact that these bodies appear in the urine, taking the place of urea. Tyrosin appears to be more frequently absent than leucin, which most observers agree is constantly present. Schultzen and Riess found, also, in the urine a peptone-like substance. These physiological chemists regard the presence of leucin and tyrosin in the urine as significant as albumen in Bright's disease, and sugar in diabetes. Prof. H. C. Wood, M.D., is disposed to the same view for leucin, and he would entitle the disease *leucinosis* (see the No. of this Journal for April 1867, p. 418), a term of which, we have seen, Dr. Legg especially disapproves. Thierfelder, speaking on this relation of leucin to urea, says: "We can hardly avoid tracing a connection between its appearance in the urine and the absence of the urea, and regarding a portion at least of the leucin as representative of the urea. That the actual production of the latter substance, and not merely its elimination from the blood, is interfered with, is extremely probable, because in other diseases in which the degeneration and functional derangement of the kidneys is quite as considerable as it is here, such a disappearance of the urea from the urine is not observed." (p. 288.) Dr. Legg expresses similar opinions, tinged in this case, we believe, with a judicious skepticism.

"The disappearance of the urea from the urine together with the inorganic salts, taken together with the appearance of leucin and tyrosin, and, according to Schultzen and Riess, of a peptone, is a matter of the very deepest interest. In the present state of physiology, the place where the urea is formed is most uncertain, but the disappearance of urea from the urine leaves no room for surprise in a pathological state where every gland and every muscle is found acutely degenerated. It is interesting to observe the appearance of lower grades of tissue metamorphosis, such as leucin and tyrosin, in the urine, which some physiologists seem inclined to believe are early steps in the every-day change of albumen into urea."

As the liver has some office in connection with sanguification, and the maintenance of animal heat, it is important, from our present stand-point, to note the changes in the blood and in the temperature in this disease. As usual, there are contradictory statements, but we extract from the mass the fact that a diminution of the red and an increase of the white corpuscles take place; that the red corpuscles are changed in form; and that leucin, sometimes also tyrosin and urea, and cholesterine, are found. The hemorrhagic diathesis, which is a pronounced symptom, is not due, it is conceded generally, to the state of the blood, but to important alterations in the walls of the vessels.

In this as in other cases of jaundice, the temperature falls below normal, and remains so until the nervous phenomena develop. This decline in temperature means an arrest of those heat-producing processes in the liver which cause the blood of the hepatic vein to have a higher temperature than the blood of the portal. Furthermore, the glycogen, which we have seen is so widely distributed, so important to nutrition, and which serves to supply a readily available force by its oxidation, is no longer produced, at least, in any considerable quantity. Hence the failure of the liver to produce this material, affects heat-production throughout the organism. With the development of the nervous phenomena near the close of the case, some elevation of temperature occurs, and immediately after death a considerable elevation has taken place in some reported examples. It is uniformly observed that the temperature during the time when jaundice is developing is normal or considerably below normal, falling to 96° or 95.5° F. in some cases, before other elements besides the arrest of the hepatic function enter into the morbid complexus. Although the disturbance of the cerebral functions is usually accompanied by some febrile excitement, this is not always so, and Traube asserts that the condition of delirium does not affect the temperature.

The cerebral functions are disturbed to a greater or less extent after the jaundice has appeared, as a rule. The causes of this disturbance, from the point of view of the offices of the liver in the animal economy, are extremely important and instructive. Certain initiatory symptoms may give warning of the violent disturbance to follow; the patient may be suddenly seized with delirium and become insensible. Dr. Legg insists on the importance of dilatation of the pupil as the initial phenomenon, and the occurrence of which should excite apprehension in any case of jaundice. Thierfelder says that, besides being dilated, the movements of the pupil are sluggish. Rarely, rather, the pupils are contracted. Then come on a violent headache, restlessness, insomnia, or there may be stupor, indifference, prostration. Or "palpitation of the heart, with strongly accentuated first sound, abnormal sensitiveness to light and sounds, fainting," etc., may usher in the more formidable symptoms. Or, in still other cases, without any warning, delirium of a violent kind may ensue, or insensibility come on. Sometimes, in the midst of profound coma, an access of acute delirium may be manifest. The delirium varies in severity from a momentary incoherence up to the wildest mania. The coma manifests an equal variability: it may be a slight somnolence, or such depth of insensibility that no irritation can arouse. Convulsions also appear occasionally in adults—nearly if not quite constantly in children. These also vary from twitching of a few facial muscles up to a general epileptiform seizure, or a tetanic spasm. Legg finds that in 100 cases of the genuine disease, analyzed by himself, there were in 76 coma, in 59 delirium, and in 32 convulsions—results in general conformity to the usual observations.

In these cerebral effects, every one must be attracted by the resemblance to the symptomatology of certain poisons. The extraordinary likeness of acute yellow atrophy to phosphorus poisoning, already mentioned, will be hereafter discussed. Now the question pressing for answer is—What morbid products present in the blood can produce such disturbances? Are they of hepatic origin? We have already furnished the data for a decision on some points. The probability of the existence of the *cholesteræmia* invented by Dr. Flint, and developed by him with

great ingenuity into a morbid state, must, in view of recent researches, be denied. The absorption of bile into the blood, which occurs in ordinary jaundice, is not accompanied by such symptoms. Leyden, it is true, affirms that the bile acids, which are known to act destructively on the red corpuscles when injected into the veins of dogs, do produce nervous symptoms analogous to those of acute atrophy, but he is not supported by many facts necessary to this theory. Leucin and tyrosin injected into the blood produce no symptoms. Frerichs suggests that a special poison may be produced by the disintegrating glandular substance, and that the nervous symptoms may result from its action on nervous matter. It need hardly be stated that there is absolutely no proof of the existence of such a poison; therefore, the search for a cause of hepatic origin, to account for the nervous symptoms, proves fruitless. Are the nervous phenomena due to uræmia? Although there is a general resemblance in the nervous disturbances belonging to acute yellow atrophy and to Bright's disease, respectively, when we come to the examination of particulars, wide differences are seen. Although the urine contains little or no urea, and but a small amount of albumen, and is otherwise altered in character, it has a maximum specific gravity, excretion of poisonous matters goes on, and hence the ordinary conditions producing uræmic intoxication are wanting. Rokitsansky and Frerichs were much inclined to the uræmic theory, but the more recent investigations have apparently conclusively decided against it. Thierfelder sums up in a few words the main points:—

“The kidneys fail to present in most cases, either as respects their function or their anatomical condition, such derangements as are found in those affections in whose train uræmia is most constantly developed; and as regards the diminution or disappearance of the urea in the urine, it is much more probable, as will be presently shown, that the formation of this substance and not its elimination from the blood is impeded.”

Traube refers the nervous symptoms, not to cholæmia, but to inanition of the brain, which H. Weber supposes to be the cause of the delirium in pneumonia, and in fevers. Not only is the brain inadequately supplied with blood, but the blood is damaged; among other ways, by the action of the bile acids on the red corpuscles, and by the imperfect preparation in the intestine of the material of nutrition. Legg, rejecting all extraneous causes except the anæmia of the brain—or inanition—finds in the changes which occur in the cerebral vessels and tissues, as described by Steiner and Wunderlich, sufficient explanation of the nervous phenomena. (p. 455.)

Authorities are agreed as to the remarkable analogy between the symptoms and morbid anatomy of acute yellow atrophy and phosphorus poisoning, and some indeed maintain their identity, as has been stated. Dr. Legg sums up with great success the points of agreement and difference.

“The temptation to look upon acute yellow atrophy as identical with phosphorus poisoning is certainly very great. The features of the two states bear the closest resemblance. Both are seen much more often in women than in men, and preserve much the same proportion; both are rare in childhood, common from puberty to about 35, and then again become rarer. The symptoms likewise are almost identical; a gastric catarrh followed by jaundice, during the course of which nervous symptoms and hemorrhages are seen, the end being in most cases fatal. The only clinical distinction which has been made, and in my opinion, not very successfully, lies in the state of the urine. Schultzen and Riess, as already stated, believe that in acute yellow atrophy, leucin and tyrosin are present in the urine; while in phosphorus poisoning these bodies are absent. Setting aside the cases

of phosphorus poisoning in which these bodies are said to have been found, but which show some uncertainty, I must own, I do not think the distinction will hold. It seems very improbable that if the same grave changes in nutrition take place in both states, such bodies as lencin and tyrosin should not be common to both. The morbid anatomy of both diseases has been warmly contested. The state of the kidneys, stomach, glands, and muscles is admitted to be identical in both; but the liver is said by some to be always enlarged in phosphorus poisoning, and to show no real fatty degeneration but a mere fatty infiltration. This again is denied to be true constantly. It is said with a good show of reason, that the size of the liver in both diseases depends on the length of time that the disease has lasted; that the liver is large if the disease end early, and small if the disease last long in both."

Such close correspondence in the action of a poison and the behaviour of a disease would indicate, that the latter is produced by an unknown poison. It remains for future investigation to determine the nature of the cause. It would, indeed, be surprising if some mysterious germs, micrococci, or bacteria had not been summoned from the regions of the unknown to make plain the origin of unexplained conditions. Klebs has, as is known to all the world, found a specific parasite for almost all diseases (*Beiträge zur Kenntniss der Micrococcen—Archiv für experimentelle Pathologie und Pharmacologie*, Bandes i. ii. und iii.). Eppinger, supported by Klebs, has discovered in great numbers in the ducts of the liver the *Microsporon septicum*. It cannot be said, however, that this discovery has awakened any enthusiasm, or prepared the way for a final solution of the problem.

Dr. Legg, after concluding the subject of acute yellow atrophy, devotes a chapter to "Yellow Fever." Although in respect to symptomatology there are very obvious points of difference, yet it is almost impossible to distinguish between them in the *post-mortem* examination. He does justice to Dr. Alonzo Clark, who first pointed out the fatty degeneration of the liver, and who was followed by Dr. Bache. In the course of this chapter he differentiates between acute yellow atrophy and yellow fever, showing that some of the historical examples of the latter were probably cases of the former—a fact which indicates the close clinical correspondence of the two affections. There must, then, be a family affinity in the poison causing these diseases, and phosphorus. Beside the careful comparison at all points of phosphorus poisoning with acute yellow atrophy, Dr. Legg devotes a special chapter (the XXIVth) to the former. He shows that phosphorus has become a fashionable agent for suicidal purposes, and that "scarcely a week passes but some bodies are brought in for examination to the Pathological Institute at Berlin." The method most commonly employed in Germany, is to infuse the heads of about one hundred matches in coffee. Although the employment of this agent for suicide is not common in this country, accidents happen, with children, who may eat match heads.

But sufficient attention has been given to this department of the subject, and we, therefore, pass on to *icterus febrilis* (Chapter XXVI.)—that form of jaundice which accompanies pneumonia and certain febrile affections. Various explanations have been offered. The most satisfactory causes are two: obstruction to the bile-ducts by a plug of mucus, or by catarrhal swelling of the mucous membrane, and parenchymatous degeneration, which occurs in consequence of persistent high temperature. The jaundice which appears during the course of malarial fevers, and which Dr. Legg thinks is not frequent, is due to catarrh of the ducts and conse-

quent obstruction. He is certainly in error in regarding malarial jaundice as uncommon. He does not allude to a form of malarial jaundice which comes on without any febrile disturbance, like the cases of spontaneous ague-cake. Any one who has had experience in the malarial diseases of the Mississippi Valley, will recall examples of both; a jaundice coming on without any apparent febrile movement, and disappearing rapidly under quinia, and a splenic enlargement arising in the same way. It is, of course, known that various functional derangements occur, in place of the febrile, in acute and chronic malarial poisoning: jaundice may be the succedaneum of periodical fever. It is true, nevertheless, that the jaundice occurring in the course of malarial toxæmia may be produced by the extension to the bile-ducts of a catarrhal process in the duodenum.

In his account of *icterus neonatorum*, Dr. Legg gives the statistics of Dr. Kehrer, who had 474 cases under examination. Of these, 5.3 per cent. were jaundiced on the first day, 62.9 per cent. on the second day, 124.1 on the third day, and after that but few. In one-third of these, the jaundice was over by five days, but in the greatest number, by six to ten days. There are various explanations of the causes of this jaundice. Billard offers a satisfactory solution of the problem, for those cases, at least, of which the skin only is coloured. These, he says, are due to changes in the circulation of the skin, the fading leaving behind a yellowish tinge, like the fading of a bruise. The explanation of Frerichs seems to be satisfactory in the cases of true jaundice. It has been pointed out already that jaundice may be due to lowering of the blood-pressure in the portal system. When the umbilical cord is ligated, the blood which passed into the portal vein from the umbilical, is suddenly cut off. Although in strong infants the balance of the circulation is quickly restored, in weakly infants, the lungs not thoroughly distended, the conditions are brought about for the flow of bile into the blood, instead of into the ducts. In other cases, as Virchow has pointed out, the jaundice is catarrhal. There are, also, quickly fatal cases from congenital narrowing or deficiency of the gall-ducts.

Our author also describes an *icterus menstrualis*, in which a monthly jaundice appears, instead of the normal menstrual flow. This is so rare as to be a pathological curiosity rather. The last chapter of the work is on bilious diseases, which we have already examined. He does not consider any other diseases of the liver than those having relation to the biliary function. Congestion, inflammation, sclerosis, suppuration, amyloid disease, cancer, parasites, etc., and the diseases of the biliary passages, he is silent in regard to. He may intend to follow this with another work, in which all other topics than those he has here discussed will receive adequate treatment; but he gives no information about his future purposes. This work, on the whole, is disappointing. It is able, and exhibits both learning and industry; but there is much repetition due to an imperfect arrangement of the topics discussed, and faulty digestion and assimilation of the vast material here accumulated. Dr. Legg not only shrewdly comments on the facts and opinions of others, but he has no little original knowledge of his own to offer. It is much to be desired that he complete the subject by another volume which shall embrace the topics not included in the present work. There are many interesting and important diseases of the liver requiring elucidation, and on which, we doubt not, he would cast a brilliant illumination. Meanwhile we may supplement our running comments on these diseases of the liver involving

the biliary function, and in a future number submit some criticism of the modern opinions and practice in respect to the other hepatic diseases. Notwithstanding the rather gloomy view taken by Dr. Legg of the modern contributions to hepatic physiology and pathology, we believe that substantial progress is being made. Especially is progress making in the department of hepatic therapeutics. As the treatment of diseases can make sure advances only on sound acquisitions in physiological pathology, we may draw from the advance in hepatic therapeutics the just conclusion that our knowledge of the liver is really extending.

R. B.

ART. XIV.—*The Principles and Practice of Surgery, being a Treatise on Surgical Diseases and Injuries.* By D. HAYES AGNEW, M.D., LL.D., Professor of Surgery in the Medical Department of the University of Pennsylvania. Profusely illustrated. Vol. II. 8vo. pp. 1066. Philadelphia: J. B. Lippincott & Co., 1881.

THE first volume of "Agnew's Surgery" was noticed in the number of this Journal for January, 1879, and we have now the pleasure of welcoming the second, in which the author has treated chiefly of *injuries and diseases of joints, of amputations, of injuries and diseases of the genito-urinary organs, and of affections of the spine and mouth.*

The first chapter (Chapter XI. of the complete work) is devoted to the consideration of dislocations in general and in particular. That complete luxation may, in enfeebled subjects, occur without laceration of the capsule is regarded as possible, though we are "not aware of the existence of any specimen which establishes the statement." Manipulation is recognized as an old method of reduction, systematized and its process formularized, however, only by modern surgeons.

Compound dislocations are advised to be treated antiseptically, the author here, as elsewhere, showing himself favourable to "Listerism"; and it is declared to be the "safest course to cut away the displaced ends of the articulating bones." The Astley Cooper limit of time proper for the reduction of old dislocations, it is thought, may be materially extended in these days of anæsthetics and of intelligent manipulations, the patient having been duly informed of the dangers attending the attempt at replacement, and subjected for some days to preliminary preparatory movements.

Under the head of "dislocation of the inferior maxillary bone," notice is taken of subluxation and "noisy movements," as also of "cramp of the jaw" from spasmodic contraction of the anterior belly of the digastric muscle, such spasm being "easily removed by friction with the finger over the rigid muscle". Replacement of dislocated vertebræ is directed to be made, if possible, in all cases.

Separation of the clavicle and the acromion process are denominated dislocations of the scapula, instead of the more usual "of the outer end of the clavicle;" and for the same reasons, the displacements at the ankle are described as luxations of the foot, instead of the bones of the leg. In the treatment of the various forms of clavicular and scapular luxations no mention is made of the use of plaster of Paris, which certainly best fulfils the one essential indication of securing as completely as possible the immobility of the replaced parts.

Of the scapulo-humeral dislocations the subcoracoid is regarded as the most common; and in all the varieties the author believes that "the coracohumeral part of the capsular ligament remains untorn," and "performs an important office in conducting the head of the bone into the glenoid cavity during properly applied efforts at reposition." In treating of attempts at the reduction of old dislocations of the shoulder, reference is made to twenty-four cases of resulting injuries of the axillary vessels, fifteen terminating fatally, seven recovering, and two "not determined."

Fracture of the surgical neck of the humerus, in such attempts, is not regarded "as a calamity, but as a desirable occurrence," permitting of the establishment of a false joint. Of the cause of the peculiar deformity and great difficulty in the reduction of the backward dislocation of the thumb, the author says, "after producing the luxation on the cadaver, and then carefully dissecting the thumb, I have no doubt" that they are due, "in most cases," to the action of the two portions of insertion of the short flexor. That a backward luxation of the head of the femur may occur, it is believed necessary that the limb should be in a state of *adduction* or *internal rotation*, the posterior part of the capsule being torn, and the bone passing directly backwards.

There is, it seems to us, strong reasons for believing, with Mr. Morris, that in the large majority, if not all, of these luxations, the head primarily presses upon and lacerates the lower and inner portion of the capsule, the thigh being *abducted* and often rolled *outwards*; the ultimate location of the displaced head depending upon the duration and direction of the secondary force. The author reports having once found, upon dissection, an untorn ligamentum teres in a case of thyroid luxation. In treating of sciatic displacements no reference is made to "Allis's test," the application of which will certainly, in doubtful cases, be of great value in establishing the nature of the hip-injury. A table is given of twenty-three cases of anomalous dislocations. As respects the occurrence of partial or incomplete luxations of the hips, it is declared that "we are not at present in possession of any facts which can be considered as conclusive on the subject."

Chapter XII. on *diseases of the joints* will be found, by practitioners generally, to be as valuable certainly as any other in the work, treating as it does of cases that frequently come under care, the favourable or unfavourable termination of which largely depends upon the time at which the disease is recognized, and the nature of the treatment instituted. For the relief of the inconveniences and dangers of movable bodies within the knee-joint, removal of such by the indirect method is advised. In severe sprains warm applications have been generally found to "yield the greatest comfort." Nothing is said of the early application of the immovable dressing (though immobilization is advised in cases of so-called irritable joint), an omission which is to be regretted; for in many, if not most cases of sprain, fixation of the joint by the plaster-roller or the Bavarian splint gives almost immediate relief, and materially shortens the period of convalescence. Of course judgment must be exercised as to the time the dressing is allowed to remain, for if left on too long it will do harm by preventing motion. This latter our author advises to be made as soon as the thermometer shows no abnormal heat, without regard to the presence of either pain or swelling, a rule that obviously cannot be applied when the permanent dressing is used. Massage is merely mentioned. In joint-wounds absolute immobilization is insisted upon, aspiration being directed

if the joint becomes distended, or, if the pus has passed outside the joint, free incision. Passive synovitis is regarded as inflammatory, the absence of redness of the membrane being due to "the depleting effects of the free transudation." In bony ankylosis of the knee subcutaneous drilling and fracture of the femur is advised. Osteotomy with saw, or, better, chisel, which, by most, at present, is regarded as the more advantageous operation in these cases, is dismissed with the simple statement, that "the division of the femur might also be effected by the Adams saw."

In certain cases of joint contusion it is thought that a primary disturbance of the cartilage-nutrition takes place "before any structural alteration in other portions of the joint." As respects the vexed question of "scrofulous disease of the joints," it is said, "I am not prepared to reject altogether the old doctrine of constitutional organization predisposing to arthritis in young persons. This may be quite as appropriately expressed by strumous disease as by any other term. . . . While I do not deny the possibility of hip-joint disease being developed in a child of sound constitution, yet such an occurrence is, in my judgment, entirely exceptional." In presenting, in tabulated form, the differential diagnosis between sacro-iliac and hip-joint disease, pain is put down as "never at the knee," a statement certainly too general, for, in some cases, where the disease affects the anterior surface of the joint, pain is felt at the knee, consequent, of course, upon irritation of the obturator nerve as it passes across.

Respecting the mechanical treatment of hip- and knee-joint inflammations the following words, as the expression of the views of an experienced and cautious surgeon, deserve full consideration: "Motion without articular pressure or friction is simply impossible, and it is not in the power of man to make it otherwise. . . . I believe that the various mechanical appliances designed to combine extension with motion are, in most instances, highly prejudicial, tending to perpetuate inflammation, and to favour suppuration, and thus either to prevent resolution of the arthritis, or to delay ankylosis when that termination is inevitable. All the so-called walking-splints, which allow the weight of the patient to rest on the affected limb, not only do not, in my judgment, fulfil the indications required in the treatment of coxalgia, but are at variance with all the principles involved in the management of the inflammation." Thomas's splint, or something like it, with elevation of the sound foot, is preferred in cases of hip-disease, Hutchison's plan of simply keeping the foot on the diseased side clear of the ground not being favoured, because of the necessity, for the securing of absolute rest, that the "muscles, as well as the bones, should be in a state of quietude." When excision of the diseased hip-joint becomes apparently necessary, preliminary digital exploration is advised. In knee cases, after a due confinement to bed, when all the possible advantages have been derived therefrom, it is recommended to get the patient up on crutches, and a raised shoe on the sound foot, and let him move about as freely as he may be disposed to. When the disease has advanced to the stage when either the affected joint or the limb must be removed, "excision is always to be preferred for children, and amputation for adults."

In the succeeding chapter there are given, briefly but clearly, the general indications and contra-indications for bone and joint excisions; the rules to be observed; the various proper operative procedures; and statistical statements of their value. Special reference can be made to but a few points. Contrary to the opinion of many, the author does not believe

that partial excision of the elbow for disease is more dangerous than complete excision; he no longer employs the Esmarch bandage in these operations, and declares that the value of the subperiosteal method has been very greatly exaggerated.

In wrist-excisions he does not believe it necessary to remove the entire carpus if the disease has not extended beyond the first row. No reference is made to rib-excisions in cases of empyema. In gunshot injury of the head of the femur primary excision "will be indicated in all cases in which no other serious complication exists" necessitating amputation.

In similar injuries of the knee-joint, excision, it is declared, "should be abandoned," and in this opinion surgeons generally will coincide; except, in cases that can quickly and easily be transferred from the field to a permanent hospital where they can receive proper attention. Ankle-joint removals are evidently not favoured, the propriety of the operation being held to be "still under discussion;" and an unfavourable estimate is made of the value of partial excision of the femur, and of complete and even partial ones of the tibia—more unfavourable than will by many be deemed just, taking into consideration, the operations for ununited fracture of the former bone and for phlegmonous osteo-periostitis of the latter. "When several of the tarsal bones in front of the os calcis and astragalus are involved in disease or injury, a Chopart or Pirogoff amputation will be preferable to excision;" the correctness of this statement we are inclined to question, for the results of the few incisions that have been made have been generally very satisfactory, and we cannot but think that in the future surgeons may say of these removals of the foot, as our author says of amputation of the arm before excision of the elbow became a recognized operation: "It is sad to contemplate the number of feet that were amputated which might have been saved had the method of excision received that attention to which it was entitled."

Between this chapter on excisions and that upon the nearly related subject of amputations, are put in chapters on minor operations, upon general considerations with regard to operations, and upon anæsthetics. That upon general considerations, though from its very nature it does not permit of special review, deserves the careful attention of all readers of the work, presenting, as it does, clearly and succinctly the results of long experience and careful observation.

As respects anæsthetics, preference is decidedly expressed for ether, no man it declares having "any right to jeopardize unnecessarily the life of a fellow being. Chloroform, except in the few cases when ether fails to produce decided anæsthesia, should be banished from surgical practice." In tracheotomy for croup it is advised to withdraw the anæsthetic after the first incision through the skin has been made. There is no mention of the employment of the bromide of ethyl (the career of which was so "rockety"), of the use of the mixed anæsthetics, nor of the preliminary administration of a hypodermic injection of morphia.

Amputations receive full consideration both as respects the general indications and contraindications therefor, the time at which and ways in which the operations may and should be made, the results of the limb removals, and the special amputations in the upper and lower extremities.

In common with surgeons generally, primary operations are favoured; the advantages are recognized of both circular and flap methods according to locality; the antiseptic method is believed to materially shorten the period of healing, though it is unsettled whether or not it lessens mor-

tality. The "open method" is simply mentioned; no reference is made to Broca's way of controlling spasm, by compression of the main artery of the extremity. Post-amputation osteo-myelitis is regarded as the product of osseous concussion and rarely due to saw-violence. A table is given of seventy-four multiple primary amputations, and triple synchronous amputations are mentioned.

Reference might also have been made to what came very near being a quadruple synchronous amputation, the case reported by Act. Asst. Surg. Muller, U. S. A., in which the four extremities were removed for gangrene from frost-bite, though three days intervened between the operations on the arms and legs. Respecting special amputations certain of the author's views should be noted. Instead of formal amputation of a part of the finger for necrosis or crush of the ungual phalanx, simple removal of the bone is advised; in injuries of the hand it is directed to "perform no amputation when there is the faintest probability of saving the damaged part" (the safest general rule is to make no primary operation); amputation at the elbow or knee-joint is to be preferred to one through the humerus or femur when the character of the disease or injury permits of a choice being made.

In Hey's tarso-metatarsal amputation it is stated that the second metatarsal is "sawed off on a level with the internal and external cuneiform bones." Though this statement is in accord with that of many surgical writers, and such an operation is a proper one to be made in many cases, it is not Hey's amputation; which originally was one altogether in contiguity, and afterwards modified by the taking away of the projecting part of the internal cuneiform bone. "I then separated with the scalpel the four smaller metatarsal bones at their junction with the tarsus; which was easily effected, as the joints lie in a straight line across the foot. The projecting part of the first cuneiform bone, which supports the great toe, I was obliged to divide with a saw" ("Practical Observations in Surgery," by Wm. Hey, F.R.S., second edition, London, 1810). In removal at the knee-joint the patella is to be left; mention is made of the use of the "Davy lever" in disarticulation at the hip. In treating of this latter operation no notice is taken of the method of Verneuil or that of Lacauche, procedures by which the loss of blood can be very materially diminished.

In the paragraphs (in the succeeding chapter) on *traumatic fever* the author clearly indicates his belief in the identity of cause of the febrile affections of varying degree of intensity consequent upon traumatism, such cause being "the introduction into the blood of certain subtle septic matters which are the products of tissue-decomposition. . . . The relation which minute organisms, like bacteria, found in the blood of infected persons bear to the change in the constitution of that fluid is mere matter of conjecture." In the graver septicæmic conditions drugs are declared to possess "little, if any, value as curative agents. They may seem to retard the fatal event, but never to prevent it."

One-half of the present volume is devoted to the consideration of injuries and diseases of the genito-urinary organs of the male and female. Though the importance of these affections cannot be over-estimated, and the profession will gladly welcome any contribution from Prof. Agnew's pen upon their nature and treatment, the propriety of the extended discussion at the present day in a general work on Surgery of, *e. g.*, renal diseases, or of ovarian or uterine tumours, may perhaps be questioned. As we have already done with reference to joint diseases and injuries, now we

can only take passing notice of certain points here and there that have attracted our attention because of the special importance of the advice given, the peculiar views entertained by the author, or the strength added to the one party or the other holding opposite opinions on vexed questions. Non-specific urethritis can be, it is believed, diagnosticated from that of specific origin, chiefly by the milder character of the symptoms. It would certainly be very satisfactory to every practitioner to believe that he could in all cases establish this differential diagnosis. The use of strong solutions of nitrate of silver to abort a gonorrhœa is most unqualifiedly condemned. Epididymitis is not thought due to extension of inflammation along the vas deferens, but to the sympathetic "kinship" between individual members of the same system. The radical cure of stricture is believed to be "entirely beyond the reach of surgery." Even after internal urethrotomy "the resulting cicatrix will always retain the invincible property of contraction. The tendency to coarctation in the canal is, it is true, lessened, but it is not destroyed; and hence the patient must be instructed to pass a metal sound once or twice every month if he expects to keep out of the hands of the surgeon at some future time." As is usual with surgical writers, it is positively declared that "as long as the urine can find its way out through the urethral canal, even though it is only in drops, the route to the bladder in the opposite direction is not impassable by instruments in a skilful and patient hand." This is undoubtedly true, but it is equally true that the most skilful and patient hand will at times fail to find that passable route, and from the days of Syme and Liston to the present strictures have been met with that no surgeon was ever able to get an instrument through. Divulsion is not favourably regarded, preference being expressed for treatment by dilatation, and "failing in this, incision or internal urethrotomy, followed by dilatation." In cases of senile hypertrophy recourse is to be had to the use of the catheter as soon as it is discovered that "a portion of the water remains in the bladder which cannot be displaced by the voluntary efforts of the patient." Crushing of hypertrophied masses projecting into the urethra "would be better done on the dead body, if done at all." Forced catheterization is very justly characterized as "most rash, dangerous, and culpable surgery;" and the tapping of the bladder is to be preferably done with the aspirator needle, "the simplest plan, and one requiring very little skill." No favourable opinion is entertained of washings or irrigations of the bladder in chronic cystitis, and cystotomy in the male is declared "on trial," statistics thus far not presenting a "very flattering prospect."

Varicocele, if requiring operative interference, the author prefers to treat by subcutaneous ligature, the Astley Cooper method of excising a portion of the scrotum not being favoured. For the radical cure of hydrocele, injections of the "undiluted officinal tincture of iodine should be thrown in and allowed to remain." Contrary to the belief of most surgeons, a cryptorchid is thought to be capable of begetting children. It should not be forgotten that however sound as a legal principle, it is not so as a medical one, that the husband is always the father of the child. Bigelow's litholapaxy, though mentioned and briefly described, does not seem to be very highly esteemed, or at any rate it is not advised to substitute it for the previously employed methods of crushing; indeed, if we correctly read between the lines, Prof. Agnew is not very partial to lithotritry, and would be inclined to say, as recently did a very eminent Irish surgeon, "If I had stone myself I would be cut rather than have it crushed." Of

the 29 nephrectomies tabulated (pp. 714-15), one, certainly, that of Drs. Dawson and Bartholow, was not a removal of the kidney, but of a renal calculus which had caused a perinephritic abscess.

Vaginismus, it is believed, only very rarely necessitates the use of the knife, dilatation under anæsthesia securing the desired result in the great majority of cases. Battey's operation "in cases in which there are structural changes in the ovaries or the uterus, constituting the exciting cause of persistent suffering, and undermining the health physically and psychically, and for the relief of which all the usual remedies at command have been exhausted," is declared to deserve the "unqualified sanction of the profession." An elaborate table of 107 of such oöphorectomies is given, with a general summary thereof; as also in its proper place an analytical table of 5153 ovariectomies.

Chapter XXII. is devoted to the *surgical diseases and injuries of the spinal region*. "Spinal concussion," pure and simple, is regarded as an infrequent accident, if indeed it has any existence; and the effects ordinarily attributed to its occurrence are thought to be due rather to compression of the cord or injury of parts of the nervous apparatus outside the spinal canal. No more faith is had in the "railroad spine" as a peculiar form of trouble; "it is not clear that there is anything peculiarly distinctive or original in the concussions received by persons who encounter injuries from the collision of railroad trains moving at a high rate of speed." In the earlier stages of lateral curvature mechanical treatment is declared to be both unphilosophical and injurious, since it keeps in a state of rest the muscles "on which our hopes of improvement or of cure concentrate," the result being that they "waste, and become more and more disqualified to support the body." When, however, "the structural alterations have so far advanced that all attempts to correct the distortions must necessarily prove utterly useless," the deformities demand the application of some form of jacket, plaster, leather, or steel. In posterior angular curvature it is believed that "in a large majority of cases the vertebræ are first affected, and the cartilages subsequently disintegrate from the destructive effects of the contiguous inflammation." As respects the vexed question of the traumatic or constitutional origin of Pott's disease, the author declares that, as far as he is capable of judging, "the disease commences by an infiltration or a disseminated formation of strumous or tubercular matter in the cancellated tissue of one or more vertebræ, . . . some depreciation in the health, or some injury (and here is where traumatism comes in) kindling into activity the inflammatory processes or osteitis." The importance of rest in the treatment of this disease is strongly insisted upon; such absolute rest being maintained, when the cervical or cervico-dorsal region is affected, until anchylosis is established, as "no apparatus ever devised by the ingenuity of man can sufficiently relieve the spine from the weight of the head to render the erect position safe."

The final chapter of the volume is upon the *Surgical Diseases of the Mouth*. In hare-lip early operation is advised; in the simple variety, when the child is in good health, "at any time after the second week," and in complicated cases after "four or five months." Tongue-tie is said to consist in a preternatural shortening of the frænum; really it depends upon a too-long frænum attached too far forward toward the tip of the tongue.

Respecting the chief cause of dental caries, so common in our country,

the author regards it as "not extremes of temperature, carelessness with regard to cleanliness, the use of sweets, etc., . . . but one as general as the system at large, . . . the product of all those agencies which go to make up the structure of modern social life, including eating, drinking, sleeping, exercise, and education." In cases of parenchymatous tonsillitis, next in importance after the local abstraction of blood, is placed the internal and local use of guaiacum; "the value of this remedy admits of no question." In writing of the excision of the chronically hypertrophied tonsil it is declared that the operation was "alternately revived and condemned until 1740, when Richard Wiseman, among English surgeons, popularized" it. The date is evidently misprinted. The use of Monsel's solution of iron is advised for the arrest of troublesome hemorrhage following such excision; a styptic that may perhaps be advantageously employed by an experienced surgeon, but which, in ordinary hands, is very apt to do great harm, failing to stop the flow of blood, and causing the formation of a large, soft clot, filling up the mouth. Ranula is stated to be a retention cyst arising from the obstruction of the duct of either the submaxillary, sublingual, or Rivini's glands, Fleischman's bursa Prof. Agnew never having been able to discover. That the parotid gland can be and has been completely removed is accepted as a settled fact; "there are not less than one hundred and eight cases recorded in which the evidence of the entire gland having been removed scarcely admits of a doubt." Caries of the cervical vertebræ is declared to be "much the most fruitful source" of retropharyngeal abscess; by many it is believed that such abscess is, in very young subjects at least, usually consequent upon adenitis and periadenitis. Pharyngeal stenosis is said not to be benefited "either by incision or by dilatation. . . . If the necessity for an operation should arise, the excision of a piece from the pillars of the fauces will be preferable to making a dilatation." In cicatricial stricture of the œsophagus, however, "the use of bougies finds its proper application;" such instruments being passed, as a rule, not oftener than "once in four or five days." In treating of foreign bodies in the œsophagus attention is called to the fact that "when the body is so large as to press strongly against the posterior wall of the trachea, the sense of suffocation is so urgent that the patient becomes greatly agitated, and instinctively throws the head back. . . . I believe this is the only accident in which the instinctive efforts of the body tend to destruction, throwing back the head increasing the danger instead of lessening it, by stretching the trachea more forcibly over the impacted body." Of Hamburger's œsophageal auscultation, the result in the writer's experience "has been negative." In considering the means by which the tube may be recognized in œsophagotomy, notice is taken of its "alternate distension and collapse in the acts of inspiration and expiration." When an artificial introduction of fluids into the stomach becomes necessary, it is advised to carry the tube through the nose rather than the mouth; and for removing the contents of the stomach in cases of poisoning, a stomach-pump is said to be required. When such instrument is not to be had, the stomach can be thoroughly emptied through an introduced tube, by simply depressing the head and shoulders.

The work under review may truly be said to be "profusely illustrated," for there are in this volume about eight hundred cuts. Many of them, we cannot but think, might as well have been omitted, some of them being old friends and others belonging simply to the instrument-maker's catalogue.

A third volume is yet to appear, and when it is published the profession of our country will have another native "Treatise on Surgery" of which it may well be proud. With "Gross" and "Agnew" as encyclopædic works, and "Ashhurst" and "Hamilton" as digests, practitioners ought not to be at a loss to know what to do and how to do it, in surgical cases. Will not some one write the ideal text-book for undergraduates?

P. S. C.

ART. XV.—*Clinical Lectures on the Diseases of Old Age.* By J. M. CHARCOT, M.D., Professor in the Faculty of Medicine of Paris, etc. Translated by LEIGH H. HUNT, B.Sc., M.D., Laboratory Instructor in Pathology in the Medical Department of the University of New York. *With additional lectures* by ALFRED L. LOOMIS, M.D., Professor of Pathology in the Medical Department of the University of the City of New York, etc. 8vo. pp. 280. New York: William Wood & Company, 1881.

THIS work is made up of an introduction and twenty-one lectures by Prof. Charcot and ten by Prof. Loomis. The introduction and three last lectures of Prof. Charcot's series were delivered at the Salpêtrière in 1867. The date of the delivery of the others is not given.

Prof. Charcot's introduction on "Empirical and Scientific Medicine—a Comparison between the Ancients and Moderns," is a somewhat florid discourse, not remarkable for its perspicacity. As a specimen of its manner and style, we offer the following:—

"On this side you see that *pathologico-histological anatomy* touches on pathogenesis, or rather mingles with it, and at the same time also allies itself to physiology, which in this special direction takes the name of pathological physiology.

"Now, gentlemen, it is important to notice—for it is a characteristic feature—that the end which pathological anatomy proposes to itself cannot be reached without establishing an incessant approximation of the lesion that is studied even to the minutest details of its development, and the pathological circumstances minutely observed at the bedside. And in this manner, as a consequent obligation, as a logical necessity, pathological anatomy, in proportion as it penetrates more deeply into the intimacy of tissues, becomes simultaneously more animated and living, tending toward a closer union with the clinical."

The first and second lectures are on the general characteristics of senile pathology and the febrile state in the aged. Eight lectures are devoted to a consideration of gout and as many to rheumatism, neither of which is commonly classed among the diseases peculiar to old age. The three lectures presented last in the series by Prof. Charcot, are on the clinical importance of thermometry in old age. Prof. Charcot occupies 193 pages, and Prof. Loomis 73 pages of the volume.

Professor Charcot shows, in his lectures on gout and rheumatism, that he possesses an extensive and familiar acquaintance with medical literature, and is pleased to cite authority for many of the facts and opinions which he states. He names or refers to very many of the famous medical authors ancient and modern, Greek, Latin, German, French, Dutch, Italian, English, and so presents in a summary way an outline history of gout and rheumatism from the earliest records. He mentions 287 authors,

several of them six and eight times and one thirty-three: he cites them in support of his accuracy.

The style of these lectures is in some degree sketchy and desultory. The following paragraphs are presented as a fair illustration of it. Speaking of the etiology of articular rheumatism he says, p. 149 :—

“A *medical geography* has yet to be written. Under the influence of certain preconceived ideas a deplorable confusion has arisen among all the diseases which trace their origin to cold; and it is easily understood how difficult becomes the task of criticism when observations made in remote regions are to be examined and tested.

“It seems to be established, however, that acute articular rheumatism is a disease that abides more especially in temperate climates; it is unknown in the immediate vicinity of the poles and the equator. But this disease is quite frequently met with in hot countries; it often occurs in Egypt, according to Pruner-Bey, and in the East Indies, according to Webb; in the latter country it is frequently complicated by an endo-pericarditis.

“At the Cape of Good Hope, the geranium’s native home, the number of cases of rheumatism in one thousand sick in the English army, was *fifty-seven*; while in the rigorous climate of Nova Scotia there were only twenty suffering from rheumatism in the same number of patients.

“Concerning chronic articular rheumatism, we possess no positive information, although it is at least certain that it prevails in temperate climes; in England, Ireland, France, Germany, and all Central Europe. But it may also occur in hot countries. In India, Malcolmson has found it among the Sepoys; and I myself have observed that it is a frequent disease in Naples.”

All the assertions made in these paragraphs are not precisely correct, taken in their general sense; but our space does not permit us to offer a criticism in detail. We may ask, however, which of the more than three-score species of geranium—an almost cosmopolitan genus—is indigenous to the Cape of Good Hope? The relevance of “the geranium’s native home” to rheumatism might not be quite clear, even if our question was definitely answered.

Prof. Charcot’s lectures are interesting and, in a general sense, instructive. The translation seems to have been fairly and conscientiously made.

The lectures of Prof. Loomis are germane to the title of the book. He is clear, concise, definite in style, and, refraining from mentioning medical writers, he alone becomes responsible for what he says, and in effect is more authoritative than Prof. Charcot backed by a display of learning. The lectures of Prof. Loomis bear internal evidence that he is in all respects thoroughly qualified, both by learning and experience, to execute the work he has undertaken in a masterly manner. The reader is confident that his teaching is reliable; and that a complete treatise on the diseases incident to old age from his pen would be favourably received by the medical public.

The volume is well manufactured and, as a whole, may be recommended as a praiseworthy addition to current medical literature. A notable feature of these thirty-one “clinical lectures” is that no case of any kind is mentioned or referred to as present, in sight of the lecturers and their auditors.

W. S. W. R.

ART. XVI.—*Report on Trichinæ and Trichinosis*. Prepared under direction of the Supervising Surgeon-General. By W. G. W. GLAZIER, M.D., Assistant Surgeon Marine-Hospital Service. 8vo. pp. 212. Washington, 1881.

THIS report, prepared under the direction of the Surgeon-General of the U. S. Marine Hospital-Service, is a complete synopsis of the literature and history of the parasitic worm trichina, and the affection trichinosis occasioned by its presence. The work is rendered more thorough from its including a notice of all that has been learned of the subjects in our own country. The account strikes us with wonder at the view it gives of the great acquisition of knowledge of a parasite and attendant disease which have probably affected our race from remote time, but whose existence even was not suspected fifty years ago. The parasite was first clearly recognized by Sir James Paget in 1834, and it was described and named the following year by Prof. Owen. Even as late as 1858, in *Wood's Practice of Medicine*, it is remarked in reference to trichinæ, "No evidence has yet been produced of any morbid influence exerted by them upon the system during life. They have been found in subjects carried off by sudden death, in the midst of health. Since then there has been abundance of evidence to show that "*trichina spiralis* is the most dangerous of all parasites" (Aitken, *Prac. Med.*). "Man's most dangerous enemy" (Kratz). See Report, p. 14. J. L.

ART. XVII.—*Leçons de Clinique Ophthalmologique*. Par le Dr. CH. ABADIE. Recueillies par le Dr. Parenteau. Pp. 280. Paris: O. Doin, 1881.

Clinical Lectures on Ophthalmology. By Dr. CH. ABADIE.

OF the younger Parisian ophthalmologists, none stands in higher esteem than Dr. Abadie. We remember that a few years ago, when he established his clinic *au troisième* in one of the by-streets in the Latin quarter, his *conferences* were always well attended. His service was not so large as that of half a dozen other oculists, and the rooms were small. But everything was neat and orderly, and the young surgeon was affable and, more than all, had that inborn faculty of seizing the salient points of his cases, and presenting them as a series of pictures before his hearers, which is so essential to the successful clinical lecturer.

We are glad that he has been induced to have recorded some of these lectures for the benefit of those who have not had the pleasure of hearing them. In the volume before us we find twenty-one lectures, touching upon the most varied topics in the range of clinical ophthalmology, and yet not one of which is without its special interest, in that it involves some question which is still *sub judice*. Dr. Abadie, in treating of such subjects, has given the opinions of others, with which a wide acquaintance with the literature has made him familiar, and, in addition, has offered his own views, based on original investigation or clinical experience, supported in all instances by cases, which are given in detail.

In the treatment of *ulcer of the cornea with hypopyon*, he places most

confidence in the process of Prof. Sämisch. While inclining to the opinion of an infectious origin of this serpiginous ulcer, the purely antiseptic treatment, or even the treatment by touching the ulcer with the actual cautery, he considers not sufficient. In those cases where these means have appeared to suffice, he is of the opinion that they were not cases of genuine serpiginous ulcer, but rather chronic ulcers without hypopyon. Where we have to do with the true serpent ulcer, as described by Mooren, Steinheim, and Sämisch, in which an ulcer, with grayish or yellowish borders commencing at the edge of the cornea, travels slowly over the surface and is accompanied by excessive pain, an incision through its base and into the clear portion of the corneal tissue, so as to allow an exit to the aqueous humour and the pus in the anterior chamber, offers us the only certain hope of relieving this rather rare but extremely dangerous affection.

In the treatment of *purulent ophthalmia*, he comes back to cauterization with strong solutions of nitrate of silver. Recently there has been quite a backward swing of the pendulum in regard to the therapeutics of this common and highly dangerous disease. There are even practitioners who discard caustics altogether, and rely wholly on cleanliness and some form of antiseptic dressing. That they can show a very fair percentage of good results, Dr. Abadie admits; but this he accounts for by supposing that their cases have not been of the malignant type. He considers that there are two forms of this affection—one much more intensely grave than the other, the characteristics of which are a pronounced swelling of the lids, appearing on the first day of the disease, having an erysipelatous redness, a rapidly occurring chemosis around the cornea, which early becomes involved, and excessive pain. He attaches but little importance to the abundance of the purulent discharge. In *all* cases, of whatever form, he uses cauterization of the everted lids with solutions of three to five per cent. of argt. nit. once in twenty-four hours, decreasing the strength of the solution as the symptoms abate to one or even one-half per cent. At the same time he has ice compresses applied continuously day and night, until the force of the inflammation is broken, when they are to be continued at intervals of a few hours. When the cornea is involved he uses a solution of eserine (0.05 centigr. to 10 gram. of water) three times a day.

In treating *granular conjunctivitis*, he uses a solution of liq. plumb. subacetat. (15 gram. to 15 gram. water, applied to the inside of the lids by means of a camel's hair pencil). He says nothing of the let-alone treatment, which is, I believe, American in its origin. We have ourselves long been of the opinion that true trachoma is but the local expression of a peculiar diathesis, the nature of which is not fully understood. It is not enough to say that it is a disease resulting from contagion and bad hygienic surroundings. We do not presume to deny their importance as causative agents, but that they are alone insufficient for the production of the disease is amply demonstrated by the fact that the negroes in America, even when their hygienic surroundings are of the worst, enjoy a comparative immunity from the disease. The influence of race and nationality we believe to be very great. The Irish are the largest sufferers; next come, perhaps, the Germans and French, though the English and Americans are by no means free from the disease. This being the case, no mere local treatment can *cure* a genuine trachoma. We are inclined to the opinion of Sichel, *filis*, who regards the trachomatous deposit as analogous to the tubercular, in so far as its tendency is to

destruction of the tissue in which it is imbedded. It has its regular process of evolution and degeneration, and in the large majority of cases no local applications can affect its progress. The effects of topical measures are felt wholly on the accompanying conjunctivitis. In the *pannus*, which is so often an accompaniment of this affection, he speaks highly of inoculation of the eye with purulent matter. Timid practitioners will no doubt shrink from such heroic measures, and will rather resort to *peritomy*, which is so highly spoken of by Wecker, Critchett, Bowman, and others. But of the brilliant success of inoculation when applied to suitable cases, there can be no doubt.

In commenting upon *optic neuritis accompanying cerebral tumours*, a full exposition is made of the various theories regarding the connections between the two morbid processes. He finds, as does almost every one who has studied its subject, that no one of the explanations is sufficient to account for all the facts. He gives, *in extenso*, the more recent theory of Parinaud, who thinks that the œdema of the optic nerve is but a part of the general œdema of the encephalic substance.

Atrophy of the optic nerve he divides into two forms, which are generally recognized as having distinct origins; these are the *interstitial* and the *parenchymatous*. In the former of these the morbid process has its seat in the connective tissue surrounding the optic nerve fibres, and the atrophy results from the compression made on the fibres by the cicatricial contraction following the inflammation. In the latter, the primary disorganization affects the nerve fibres themselves.

In making an *a posteriori* diagnosis, Dr. Abadie falls into an error, which is surprising in one who is generally so exact. In speaking of the appearance of the vessels on the disk, as observed in the two forms, he says they are *narrow* in the parenchymatous form, and *better filled* in the interstitial variety. Leber, in his classical treatise¹ on the diseases of the retina and optic nerves, states the very opposite to be the case. It is only after the progressive atrophy has existed for a very long time, that a slight contraction of the vessels is to be observed. During the passage from the state of inflammation to that of atrophy in the interstitial form, the veins are of course enlarged and tortuous; but the arteries are always reduced in calibre. "Ultimately," says Leber, "the arteries and veins are found to be extremely contracted in their diameter, becoming mere threads, and can be followed but a short distance into the retinal surface" (l. c., p. 858). We can readily understand that this must be the case. In the parenchymatous form, there is simply a wasting of the nerve substance, and no pressure is brought to bear on the vessels that would affect their calibre, whereas, in the interstitial form, the cicatricial contraction exerts a compression not only on the nerve-fibres, but also on the central artery and vein, which must lead in time to greater or less reduction of their calibre.

In a certain form of *parenchymatous keratitis*, in which there is no history of congenital syphilis, and the teeth do not present the characteristic notches of Hutchinson, he discerns the manifestation of a general morbid condition, which demands a most energetic constitutional treatment. The commencement of this form is abrupt, and its progress very rapid. In the course of four or five days the opacities have covered the whole surface of the cornea, and have penetrated to a considerable depth into its substance; there is intense photophobia and lachrymation. The opacities form, in his

¹ Handbuch d. gesamt. Augenheilk. B. V. p. 582 et seq.

opinion, a true sclerotic degeneration of the corneal tissue, while in the ordinary form found in congenital syphilis, the substance of the cornea does not, as a rule, undergo any degenerative change. In such cases he gives the iodide of potassium in the largest doses, from 3 to 6 or 8 grammes a day, together with quinia and iron.

The lecture on *eye troubles in hysteria* is very interesting and instructive. The French still seem to lead the van in the metallo-therapeutics of hysteric conditions, and Dr. Abadie believes strongly in its efficacy in certain cases of hysteric amaurosis. Several cases are given in which undoubtedly great and immediate improvement followed the application of metals (gold, zinc, or copper) to the temples. As was pointed out by Chareot, hysteric amblyopia is always associated with a hemi-anæsthetic condition. Dr. A. calls attention to the fact that the hysteric form of amblyopia is often found in persons in apparent good health, about whom no suspicion of hysteria ever existed. Nevertheless, a rigid examination will show a diminution of cutaneous sensibility on the affected side, as compared with the other, and what is still more curious when the metals are applied to the affected side, the anæsthetic condition and the amblyopia are in some cases transferred to the other. The same is to be said of the colour-blindness which accompanies the affection. The appearance of the polyopia monocularis which is sometimes found in this form of eye trouble, Dr. A. accounts for by accepting the theory of Parinaud that it depends on an irregular contraction of the ciliary muscle. This we would hardly deem a satisfactory solution of the phenomenon. We can understand an irregular contraction of the muscle of accommodation causing an unequal curvature of the different *meridians* of the lens, but cannot conceive how, from the nature of the accommodative mechanism, it could cause an unequal refraction in its individual *sectors*. He relates one case in which brilliant results were obtained by the use of *static electricity*. The patient was placed on an insulated stool and put in connection with one of the conductors of a static machine. As soon as she was sufficiently charged, the electricity was drawn from her by passing the finger over the brow. Every discharge of electricity caused severe pain, but at the end of a quarter of an hour, vision had materially improved. After a number of *séances*, V. was brought up to 1. The author expresses the opinion that some of the cases of so-called anæmia of the retina, whose clinical history bears a strong resemblance to that of hysteric amblyopia, are but examples of the latter disease. The relief afforded by an iridectomy he considers due, not to its influence on the calibre of the vessels, but to the strong impression which the operation makes on the nervous system.

Those lectures which are of most interest to the specialists we will pass over briefly, referring the reader to the book itself for full details. The questions of glaucoma and its treatment are discussed in the several different lectures on *glaucoma*, *sclerotomy*, and *the nutrition of the eye*. The conclusions to which he arrives are similar to those brought forward by the reviewer in an analysis of a number of papers on the subject in the number of this Journal for April, 1879, and that is, that there is some truth in all the views presented, but that no one theory can satisfactorily account for all cases, nor can one plan of treatment be adopted in all forms. With our present knowledge and from most recent observations, it would seem that sclerotomy is best adapted for cases of simple chronic glaucoma where the anterior chamber is not shallow, and in cases of hydrophthalmus. On the contrary, in cases of acute glaucoma, where the anterior chamber is almost

or quite obliterated, iridectomy still remains the sheet anchor. The chapters on *optico-ciliary neurotomy*, *foreign bodies in the eye*, *iridotomy*, and *capsulotomy*, though offering nothing specially new, will amply repay perusal. In closing the volume we can only wish that some other authors possessed Dr. Abadie's entertaining manner of dealing with what are ordinarily considered dry subjects.

S. M. B.

ART. XVIII.—*Transactions of State Medical Societies.*

1. *Transactions of the Rhode Island Medical Society.* Vol. II., part iv. 8vo. pp. 223–318. 1880.
2. *Proceedings of the Connecticut Medical Society, 1881. Nineteenth Annual Convention, held at Hartford, May 25th and 26th.* New Series, vol. ii. No. 2, Hartford, Conn. 8vo. pp. 246. 1881.
3. *Transactions of the Thirtieth Annual Meetings of the Illinois State Medical Society, held at Belleville, May 18, 19, 20, 1880.* 8vo. pp. 228. Chicago.

THE present issue of the *Rhode Island Transactions*, being part four of volume two of the series, contains the reports of three quarterly meetings, and of the sixty-ninth annual meeting, which was held in Providence, June 9, 1880.

In the Presidential address Dr. Edward T. Caswell, discussing public health, and the care of it by the State, considers the importance of properly constituted and duly authorized State Boards of Health, to the community at large. In conclusion, he reviewed the institution and progress of the National Board of Health, referring in the warmest terms of approbation to its diligence and efficiency, claiming for its work the fullest appreciation, and asking for it the cordial support, especially of physicians, in all parts of the country. He says—

“I think we are in possession of enough facts to warrant us in according all praise to the efforts of the National Board, and in rendering a cordial support to their measures. The spread of yellow fever, with our present increased means of transit, ceases to become a merely local matter. A few hours, or at the most, days may pass the bearer of contagion from Southern ports to almost any point of the more populous region of our country, and hence it becomes a matter of national importance to summarily arrest the progress of the disease. The interests of one are the interests of all, and in no way, I think, can these be so certainly secured and guarded, as by giving the fullest powers and all the necessary resources to a Board, such as the present National Board has shown itself to be.”

A Case of removal of both Ovaries by Abdominal Section, for the relief of an exhausting Menorrhagia and Uterine Fibroid, with remarks by Anita E. Tyng, M.D., was reported by the operator. The patient, a lady leading the sedentary life of a school teacher, was troubled with menorrhagia and slight dysmenorrhœa. Subsequently a sub-peritoneal fibroid was discovered which increased while under observation from 1870 to 1880 when the operation of oöphorectomy was finally performed. Hæmorrhoids had also existed, which were removed at a previous operation with great relief to the dorso-lumbar pains from which the patient greatly complained. At the time of operation the patient was forty years of age. The details of the final operation were very carefully conducted under the carbolyzed

spray, the patient being under the influence of ether. At the end of three weeks the patient was sitting up. At the first monthly period there was a slight show and headache for a few hours, both of which recurred every day for a week. The second period was accompanied by tympanites and pelvic distress, but there was no flowing. (The subsequent report of the case may be found in the *American Journal of the Medical Sciences* for January, 1881, page 188.)

Dr. W. O. Brown, of Providence, contributes a paper entitled *Atmospheric Influences upon the Animal System*, which contains the following conclusions:—

“Carefully conducted experiments have proved that, when pressure upon the air we breathe is largely increased, characteristic and definite changes are produced in the blood and upon the muscular and nervous symptoms; that this condensation may be carried to the extent of producing cutaneous eruptions, deafness, paralysis, and even death, especially upon its sudden removal.

“Through observations made under the supervision of Dr. S. Weir Mitchell and by others upon the human system, in relation to this subject, it has been demonstrated that changes in the weather, commonly, if not constantly, influence neuralgic paroxysms in some, probably in most, of their protean forms, and that there is abundant reason to suppose that the same influence is extended to a large class of other diseases.

“Ozone, which is or was at a very recent period believed to be a principal agent in the production or prevention of disease, is now proved to be nearly or quite inoperative, being usually absent from the air of cities, and in the country so diluted as to be essentially inert.

“Barometric changes are known to have sensible influence upon pain, but they are so associated with humidity and temperature as to make it difficult to estimate their separate or specific agencies.

“Electricity and galvanism evidently exert powerful, but hitherto undefined, influence upon the animal economy, and should be principal elements of study in estimating weather effects upon pain or health.

“By the use of oxygen and other gases, it may be quite possible to form an artificial atmosphere which shall be serviceable in the treatment of disease. A large class of diseases, characterized by deficient respiration, it is proved can be benefited in this manner.”

At the same meeting Dr. Geo. W. Porter read a paper on *Batley's Operation*, claiming for it a legitimate sphere in otherwise hopeless hysteroneuroses, in inveterate dysmenorrhœa, and especially in uterine fibroma. The author acknowledges, however, that the necessity for its performance only rarely occurs. He prefers the abdominal incision.

An interesting case of *Thrombosis of the Middle Cerebral Artery* is communicated by Dr. Oliver C. Wiggin, with the post-mortem examination. The autopsy showed the congenital absence of the right auriculo-ventricular septum, the tricuspid valve lying smoothly against the ventricular wall. No other sign of heart disease was present, although the left ventricle may have been a little hypertrophied. There were evidences of slight meningeal inflammation, and the occluded vessel was the seat of degenerative or hyperplastic disease of the basement membrane; a large portion of the hemisphere supplied by the middle cerebral artery was in a condition of acute softening, which occurred in the short time, sixty-five hours, that the patient survived the occlusion. “The red, softened, and corrugated state of the lining membrane of the occluded vessels no doubt took place after the accident.” The granular protuberances, on the contrary, although identical with those occurring in inflammation of the arteries, were not regarded as factors of causation of the thrombosis.

A short note upon an endemic of intermittent fever that occurred at Drownville, R. I., August, 1880, was contributed by Dr. Stephen S. Keene, who records it as the first time that endemic intermittent fever has been observed in Rhode Island.

Dr. George Capron made some extended remarks upon the use of the obstetric forceps, in which, while urging caution in regard to their unnecessary employment, especially in the high operation, proper appreciation is shown of the great advantages offered by the instrument, obviating as it does very frequently the necessity of craniotomy, and saving the life of the child. Lingering labour *per se* is not considered as sufficient excuse for the resort to the forceps; but difficult labour from various causes, especially when the head becomes impacted in the middle of the canal, urgently demands intelligent interference, and the skilful application of the forceps. Where the interests of the mother or child are not endangered, delay is advisable; and in case of convulsions the induction of premature labour by forcible dilatation and forceps delivery is deprecated and condemned.

The obituary notices read were those of Drs. Samuel Mowry, Jas. T. Buttrick, Wm. W. B. Greene, Elisha F. Lamphear, and Richard S. Satterlee. A very good heliotype photograph of Dr. Mowry is also contained in this issue of the *Transactions*, and adds to its value.

2. Among the reports of special committees of the *Connecticut Society* that on *Medical Expert Testimony* considers a very important topic. While conceding to the accused in every case the right to a fair hearing, which may include the calling of expert witnesses in the defence, for the purpose of preventing unwarrantable deductions from the scientific testimony offered for the prosecution, at the same time experts are cautioned to confine their statements to questions of ascertained facts, and to avoid the temptation of giving personal opinions or interpretations as scientific truth. The expert especially deserves condemnation when he allows himself to become the advocate of a party: "the expert is supposed to have no client even though called by a party; but is expected to state only what are undoubted facts, or reliable and generally received deductions."

The report of the committee on the subject of *Lunacy Commissions, in the United States and Foreign Countries, their Histories, Aims, and Results*," in majority and minority reports, contains much information upon the subject, and both speak approvingly of supervision by proper authorities of insane asylums in order that efficiency may be recognized and extended, and inefficiency and abuses discovered and restricted.

In the report on Matters of Professional Interest in the State some interesting short papers are communicated, among which we notice cases of *Hiccough arrested by Quinine* (in a malarial subject), and of *Pyonephrosis, with recovery after Aspiration*, both by Dr. J. W. Lyons. There are also contributions on *Lacerations of the Cervix*, by Dr. Geo. C. Jarvis; *Tuberculosis of the Mouth and Pharynx*, by Dr. C. W. Chamberlain; and the *Etiology of Intermittent Fever in the Lower Valley of the Connecticut*, by Dr. R. W. Griswold. Dr. R. W. Bunn describes an outbreak of dysentery following the use of impure ice, and Dr. A. Peck gives an admirable summary of the *Treatment of Typhoid Fever*.

Dr. E. C. Seguin, of New York, delivered before the Society a dissertation upon the *Importance of the Early Recognition of Epilepsy*, "in which a number of cases are quoted in illustration of the neglect by physicians to recognize epilepsy in its early and most curable stage. *Petit mal* is often

ignored for years, and is usually looked upon as a trivial affection." While apparently of less importance than convulsions, the converse is really true. The importance of early treatment is insisted upon before the habit of convulsions is acquired, or the so-called epileptic centre (?) established in the brain. The subject of treatment is only incidentally considered in this paper, which is devoted mainly to diagnosis. The important distinction existing between eclamptic attacks and true epilepsy is insisted upon, and attention is called to the error of admitting beyond the true infantile age (3 to 4 years) a marked liability to symptomatic or eclamptic convulsions. Conceding that the symptoms of eclampsia and epilepsy are similar if not identical—"the same symptom-group occurring under different conditions"—the following summary of the diagnostic points is given:—

1. After the third year such attacks are very probably epileptic. The possibility of uremia and of syphilis should be borne in mind and a careful investigation made as to their existence.

2. Under the third year the attack may be eclamptic, probably is, but its causes should be carefully judged.

3. In many cases under three years it is well to give a moderate amount of bromide of potassium (or sodium) with regularity for several months after a convulsion; that is to say, in such cases as do not present an evident, indisputable pathological condition sufficient to cause eclampsia.

4. In all cases above three years the bromide treatment should be at once instituted and kept up for many months.

An interesting and timely essay on *Sympathetic Ophthalmia* is furnished by Dr. S. B. St. John, dwelling particularly upon the importance of early recognition of this serious affection, especially when associated with a traumatic cause, and advocating optico-ciliary neurotomy of the offending eye in preference to enucleation, wherever practicable.

Dr. Fleischner, of New Haven, in a paper on *Non-Pharmacological Therapeutics*, in which he especially considers the applications and the utility of water in the form of the bath or wet pack in a number of disorders, makes a very strong plea for hydropathic treatment of fevers, more especially those having a wide thermometric range. Not only in the eruptive fevers, like scarlatina, but also in inflammatory processes in the thorax, or abdominal, and especially the pelvic organs, is this form of treatment of great service. A caution is given against the too frequent use of the hot vaginal douche as tending to produce subsequent relaxation of tissues; for sudden emergencies such as hemorrhage, the value of hot water injections is acknowledged, but for chronic conditions, as in passive discharges, cold applications are more curative.

In an essay containing the notes of thirteen cases operated upon by Dr. Matthew D. Mann, entitled *Clinical Observations on the Treatment of Laceration of the Cervix Uteri by Operation*, the proceeding of Emmet is warmly endorsed, as a discovery which, with Sims's operation, marks an era in gynecology. The reporter found about one case out of three of chronic uterine disease was suffering from this form of laceration, and as a rule admitted of permanent relief, only by denudation and suture. In more than thirty operations he had never seen a single bad result attributable directly to the operation.

From a consideration of *Milk; its Nature, its Contamination, and as a Vehicle of Contagion*, Dr. M. M. Johnson draws the practical deductions that milk may contain the germs of a disease from which the animal producing it is suffering, and may communicate this disease to persons consuming the milk (especially tuberculous disease). Also that one cow's

milk is more dangerous for the feeding of infants than the mixed milk of the dairy. Furthermore, that contagious diseases (typhoid, scarlatina, diphtheria) are frequently transmitted to families by milk. "When a contagious disease is taken into the system by ingestion, it causes an irritation of the alimentary canal, resulting in vomiting and diarrhoea, and the period of incubation is greatly shortened."

The foregoing paper is well supplemented by one by Noah Cressy, M.D., read at the same meeting, on the *Transmission of Bovine Tuberculosis from Infected Milk*, in which the actual and present danger to the community from this source is earnestly insisted upon and State aid invoked to prevent the sale of milk from tuberculous cows.

In an essay on *Laceration of the Female Perineum*, Dr. W. C. Burke, Jr., very ably and forcibly discusses the means of obviating this accident by relaxing the perineum, compelling the head to hug the pubic arch, and seeking to disengage the head in the interval between pains; so-called supporting the perineum is unsparingly condemned. Immediate, or the primary operation is recommended, coaptating the parts as closely as possible; being sure to pass the sutures deep enough to restore the perineal body, and not the integument and superficial structures alone.

Some obituary notices of deceased associates, and the usual lists of members close this more than usually interesting report of this relatively venerable Society.

3. One of the events of the thirteenth annual meeting of the *Illinois Society*, which deserves a special note, was the severing by Prof. N. S. Davis of his official relation in the Society as its Permanent Secretary, a position held by him continuously for nearly thirty years, with great advantage to the Society. His reason for this step was failing health.

The President's Annual Address, by E. Ingals, M.D., of Chicago, was especially devoted to the consideration of the duties of the government and the medical profession in regard to exciting public interest in sanitary questions. The disposal of sewage, especially as the problem is presented in Chicago, and the importance of good ventilation, were particularly deemed worthy of discussion in the deliberations of the society.

The proceedings of the session were largely in the form of reports upon special subjects made in accordance with appointment at the previous meeting; of which there were eight presented; the volunteer papers were only six in number.

In the *Report on Practical Medicine*, Dr. W. S. Caldwell advocates the wet-sheet and quinia in pneumonia, with alcohol, digitalis, and opium; and the treatment of diphtheria by quinia, tincture of the chloride of iron, and alcohol; with local applications (of tannin (3ij) alcohol (3ij) and water (3j), or powdered alum freely applied). When laryngeal symptoms manifest themselves, he recommends inhalations of spray of carbolic acid and lime-water. In this article are cases that appear to demonstrate conclusively the contagious character of diphtheria under ordinary circumstances; and also the great importance of fresh air in its treatment.

A very interesting report of an *epidemic of mumps* was communicated by Dr. F. B. Haller; in the neighbourhood of Vandalia. "there seemed to be no escaping the specific influence of the disease, by those unprotected by a former attack; all fell victims." Metastasis among male adults, to the testes, occurred as a rule; this likewise appeared on boys, who were also liable to brain complication. Metastasis scarcely ever occurred among

adult females, and in no instance among young girls. In men the left testicle was most commonly affected, in some cases both were involved, it was believed that in some virility was lost as a result of the inflammation.

Tracheotomy in Croup and Diphtheria with Cases is the title of a valuable contribution to this subject by Drs. Lee and Fenger of Chicago, which contains a tabular statement of 22 cases operated upon, 17 by Dr. Lee, 5 by Dr. Fenger, most of which were cases of diphtheria; the former operator with six recoveries, the latter had three. The explanation of the serious mortality after the operation is that its performance is usually delayed until the case is otherwise hopeless. In the treatment of diphtheria much stress is laid upon the benefit of the *continuous* spray of carbolyzed lime-water by a steam atomizer, devised by Dr. Lee, both prior and subsequent to tracheotomy. The tube is to be removed for a short time on the fourth day, each day increasing the length of the time.

The early and lamented death of Dr. F. H. Davis, of Chicago, lends a sad interest to an article from his pen in this volume entitled "*Inhalations in the Treatment of Pulmonary Diseases*," in which the indications for the use of pulverized solutions with or without steam, and dry gases and vapours of volatile substances are very ably set forth, and the details clearly described. The volatile oil of eucalyptus is especially recommended; in profuse purulent secretion, it appears to be better tolerated than carbolic acid.

Dr. Wm. Hill, chairman of Committee, furnished an interesting *Report on Surgery*, and Dr. Fredrick Cole reported two cases, one of compound fracture of the ankle-joint (Pott's), and one of crush of the foot, in both of which by conservative surgery and continuous irrigation with iced carbolyzed water the foot was saved. Upon reading the account it appears very evident that the healthy condition of the patients, and their admirable hygienic surroundings, being in the fresh air of the country, had very much to do with the unusual result.

A very convenient universal extension splint for raising patients bodily from the couch, was devised by Dr. Verity; its construction is fully explained with its mode of application. The entire outfit can be made by any blacksmith, and need not cost over ten dollars; it seems to be of great utility in a number of conditions in which the patient is helpless or nearly so.

The *Report of the Committee on Advance in Obstetrics* urges the importance of making practical midwifery a part of the curriculum of every medical college, and the attendance upon such a course a prerequisite to graduation. They also report two instances of maternal impressions affecting the physical structure of the fœtus; and finally discuss the value of anesthetics in labour, and urge the general but judicious use of chloroform, not carried to its full toxic effect. In a partial report from the same committee, Dr. L. H. Carr calls attention to the value of neurasthenia as an evidence of uterine disease, which, moreover, is generally its exciting cause. "The efforts to cure the disease of the nervous system, while ignoring the uterine disease, are failures in a greater number of cases than are the efforts to cure the uterine disease without addressing remedies directly to the exhausted nervous system."

In the *Report on Ophthalmology and Otology*, an interesting case of double optic neuritis from a violent fit of anger, followed by recovery, is recorded. The remainder of the report discusses the pathology of suppurative inflammation of the middle ear, and insists upon the importance of instituting early treatment, so as to prevent the dangerous results of pressure of retained products of inflammation in the tympanic cavity.

Insufflation by the Politzer or Valsalvian method is recommended, and also puncture of the membrane where there is much tension; the free use of the warm-water douche half an hour at a time will greatly relieve the pain and the attendant congestion. Bromide of potassium and chloral with opium is much more efficient than opium alone in the treatment of ear-ache. In chronic suppuration nothing especially new is offered, beyond the general warning against neglect of ear discharges which so frequently produce fatal results. Astringent solutions of zinc sulphat. (gr. iv), acid. carbolic. (gr. j), or plumbi acetat. (gr. x) to the ounce of water are recommended. Boracic acid (gr. xx to 3j) has also been used with good results; potassium permanganate seems too stimulating, and has been discarded by the reporter. In cases with perforation, after discharge has stopped, the artificial membrana tympani cut from writing paper, as recommended by Dr. Blake of Boston, has given good satisfaction. In all chronic cases of ear discharges, the importance of treatment of the naso-pharynx is acknowledged and insisted upon.

In eye diseases, cold applications for various forms of conjunctivitis, especially the purulent variety, as recommended by Dr. H. Knapp, of New York, are fully endorsed by the reporter, who believes that they offer a greater proportion of successes than any other treatment. The rules are first to see that the eye is kept clean, and, secondly, to persistently apply cold by means of very light compresses frequently wet with ice-water.

Dr. A. Z. Gill, after ably discussing the vexed question of the *Identity or Non-identity of Membranous Croup and Diphtheria*, and after a careful weighing of the evidence, offers the following conclusions:—

1. There is no distinction to be made from a microscopic examination of the exudate which would lead to a division of membranous laryngitis into non-diphtheritic and diphtheritic, or simple membranous croup and diphtheritic croup.

2. There is no distinction, clear and decided, to be made, based on chemical examination of the membranous product.

3. Every clinical manifestation by which a distinction might at first appear between diphtheritic and non-diphtheritic membranous laryngitis is unreliable, in a differentially diagnostic point of view.

A table of 23 cases of tracheotomy for croup or diphtheria is continued from 1879. The total reported from this state was 129, with 27.9 per cent. of recoveries: 36 recovered; 93 died; of these, nine died on the table or immediately after the operation. F. W.

ART. XIX.—*The Hygiene of Emigrant Ships*. By THOMAS J. TURNER, A.M., M.D., Ph.D., Medical Director U. S. Navy. 8vo. pp. 71. Franklin Press: Rand, Avery & Company, Boston, 1881.

THIS essay very clearly shows that the laws of the United States, designed to preserve the health and lives of passengers while they are on shipboard, are not respected by those whose business is to transport people across the sea between Europe and this country. In ten years (from 1870 to 1879), 1,561,126 emigrants arrived in New York. On an average they were at sea thirteen and a half days. Of those embarked in Europe 2518 died on the way here. From January to September inclusive, 1880,

nine months, thirty-four of the passenger ships that arrived at New York were reported for "overcrowding." Under the statutes, all those vessels together might receive on board an aggregate of 28,090 passengers. They received on board 33,266, or 5170 more than the law authorizes—an average excess of 156 in each ship. Of the whole number embarked, 37 died.

If thirty-seven persons died in the course of a voyage lasting from 9 to 16 days because more persons were taken on board than the law permits, the agents of the transportation deserve whatever punishment the law imposes for taking of life through negligence.

"Overcrowding" means requiring a larger number of persons to sojourn in a limited area than it was designed to contain without painful inconvenience or peril of health, and therefore signifies deficiency of pure respirable air, as well as the presence in it of foreign matters known to be detrimental to the health of most of those who respire air thus contaminated during any considerable time.

What proportion of those 37 deaths is undoubtedly ascribable to overcrowding?

Analysis of the tabular statement of the extent of overcrowding on each of these 34 reported ships, given by the author, shows that all the deaths occurred on 15 ships. Together they carried 14,874 passengers, of which number 2843 were in excess. On an average each ship received on board 991.6, which number includes 189.5 in excess of the number of passengers the law allows. The average duration of the voyage was 12 days 20 hours. One ship with 1331 emigrants on board, being 474 in excess of the number she may lawfully carry, lost 13 in the course of her voyage of 16 days.

On the other hand, 19 of the 34 vessels reported for overcrowding took on board 18,392 immigrants, an average of 968 on each, including an excess of 2327, an average of 122.5, without a death. The average time at sea was 11 days 21 hours.

The ships on board which passengers died were relatively very much more overcrowded than those on board of which none died, and they were at sea one day longer.

Within the same nine months, 575 vessels arrived at New York that were not reported for overcrowding. Of their 258,926 passengers 172 died. The mean duration of the passage was 12.7 days.

Such data alone do not show that deaths of passengers are ascribable to overcrowding only, but they very clearly imply that the provisions of law in this connection are disobeyed with impunity and without reference to the possible consequences to passengers.

The theme of Dr. Turner's praiseworthy essay is a proposed law, entitled the "Passenger act of 1880," which was presented to Congress April 8, 1880, by the Hon. Peter V. Deuster, of Milwaukee, Wis. Dr. Turner considers each section of the proposed law separately in succession, and ably discusses all questions and conditions which influence the comfort and health of people on board of ships. Incidentally to each section of the proposed act, he treats of overcrowding, ventilation, air, respiration, food, cooking, potable water, warming, humidity, dryness, dry-rot in ships, bilge water, sick quarters, water closets, etc. etc. An appendix contains the several laws in reference to the subject, reports of ill treatment of passengers and crews of ships, and a bibliography.

His experience afloat, his long devotion to nautical hygiene, his acquirements and ability, as well as the importance of the subject, entitle Dr. Turner's work to respectful attention.

W. S. W. R.

ART. XX.—*Clinical Lectures on the Physiological Pathology and Treatment of Syphilis, etc.* By FESSENDEN N. OTIS, M.D., Clinical Professor of Genito-Urinary Diseases in the College of Physicians and Surgeons, New York. Large 8vo. pp. xvi., 116. New York: G. P. Putnam's Sons, 1881.

THE feature, for which Dr. Otis's book (which is a reprint of clinical lectures, originally published in the *Boston Med. and Surg. Journal*) will be most praised or blamed, is the development and advocacy of a theory which—while not altogether novel—is here pushed to an entirely novel extreme. The belief that syphilis is a disease, primarily and essentially, of the lymphatic system is not confined to the author; while, on the other hand, he probably stands alone in the attempt to explain away the existence of a syphilitic virus, and account for all the effects of syphilitic inoculation upon purely mechanical grounds. He seems to be satisfied with the conclusion that, *because*, in every syphilitic lesion there are found lymphatic vessels or spaces filled with imperfectly developed and abnormal lymph-corpuscles, *therefore*, all syphilitic lesions are due to obstruction of the lymphatics with such corpuscles. Beginning with the initial lesion, he thinks the introduction of diseased lymph-cells (if we understand him aright) from a syphilitic lesion sets up a morbid process in the cells with which they first come in contact, and that these communicate the vicious tendency to others, the rapid and immature multiplication of which results in a localized induration. Presently (to omit accidental phenomena) these cells get into the lymphatic ducts, sometimes causing them to swell up and become hard, and then pass on to the nearest glands. These becoming overcrowded, buboes appear. Next the growing host of the disaffected scatter everywhere, and the effects, often called first constitutional effects, upon the skin and mucous membranes are manifested. The natural continuation of this view accounts for all the later manifestations of syphilis.

Objections must rise in the mind of many a reader as he feels how interesting this theory is, and yet cannot, so readily as the author, apply it to all the facts. Why, for example, should distorted cells, which have escaped the rather coarse meshes of the lymphatic glands, and whose influence everywhere else is explained on purely mechanical grounds, affect the sympathetic nerves in some mysterious, un-mechanical way, and thus cause the roseola of early syphilis? Why should we be asked to recognize a "paresis of the vaso-motor nerves of the cutaneous envelope (skin?), caused by a special but limited paralyzing influence exerted upon the great sympathetic nerve, through positively recognized blood changes, immediately preceding, accompanying, or following an initiation of the so-called secondary or active period of syphilis?" That sounds all right, but we don't quite follow. The explanation suggests harder questions than those which gave rise to it, and we do not get up from it satisfied. Indeed, just here we receive the impression of a strain, on the part of the author, to account for a phenomenon to which his theory does not very well apply, and to give the *coup-de-grace* to Mr. Erasmus Wilson, for making too much of the idea of a *materies morbi*, which Nature attempts to eliminate by the skin and its reflexions.

Having thus expressed our failure to accept at once his theory, it is but just to Dr. Otis to say that there are few books on the subject of syphilis which we have studied with so much satisfaction as this one has given.

The careful and systematic elaboration of his theory has deserved and compelled close attention in attempting to properly estimate it, and we think, on closing his book, that the author is to be congratulated upon the success he has attained in a most difficult and arduous task. Others, in reading, may feel with us that the case is not quite proved, that, if a little less had been claimed, a great deal more might have been granted. But we feel sure that every careful reader of the book will be instructed, and that it will prove an important ally of those writings which maintain that syphilis is essentially a lymphatic disease, that its initial lesion has nothing whatsoever to do with the chancre, that many subsequent phenomena are simply sequelæ. Finally, we wonder whether it will be long before some one shall arise to assert and maintain that there is no such thing—in an accurate sense—as hereditary syphilis; though such an opinion is as yet heterodox.

C. W. D.

ART. XXI.—*A Treatise on the Continued Fevers.* By JAMES C. WILSON, M.D., Physician to the Philadelphia Hospital and to the Hospital of the Jefferson Medical College, and Lecturer on Physical Diagnosis at the Jefferson Medical College, etc. *With an Introduction by* J. M. DA COSTA, M.D., Professor of the Practice of Medicine and Clinical Medicine at the Jefferson Medical College, Physician to the Pennsylvania Hospital, etc. 8vo. pp. xviii., 365. New York: Wm. Wood & Co., 1881.

THERE is no class of diseases that are of more usual interest to the general practitioner of medicine, than “the continued fevers.” In view of their frequency, their gravity, the fact that they attack all ages and conditions of life, that an accurate knowledge of their prophylaxis is essential in preventing their outbreak and arresting their spread, that their true treatment is still *sub judice*, it would appear none too soon to have in our country a modern text-book of the subject which should be satisfactory. Of course a description of continued fevers, and often a good one, is found in our works on Practice of Medicine, but these always fall short in respect to their amplification of details. Their general description of each disease from a clinical stand-point may be sufficiently graphic, but special symptoms are not dwelt upon at length, nor analyzed in such a way that the reader carries after their perusal, a full remembrance which will remain with him. If we turn to special works on this subject, either American or foreign, they are too elaborate in details, or in the form of lectures, and not written exhaustively as a systematic treatise should be.

The work of Dr. Wilson is preceded by a short, but admirable introductory chapter, by Professor Da Costa, on the general management of fever patients. In a few pages there is found an extract of much sound learning and wisdom. How well the happy medium in the medical doctrine of fevers is upheld! Let fever patients drink water and abundantly of it, but not immoderately, says Da Costa, and so as to keep the gastric vessels constantly tense and as a sure result engender complete inappetence, or even disgust, for nutritive fluids or solids. Give alcohol, says the same authority, when the first sound of the heart is wavering, uncertain, or completely suppressed, or when there is muscular tremor and delirium, and rapidly are these symptoms ameliorated. In regard to the

use of the cold bath, however, we have a word of criticism to offer. Are not its advantages much exaggerated and its risks withheld by the majority of writers? For our part we have endeavoured to do without cold baths in our treatment of continued fevers, mainly because we have not been able to comprehend the great utility of lowering even high temperatures during a few hours, when the cost price of each bath is almost invariably considerable fatigue and exposure. The heat-producing centres are not in this way permanently modified, nor to such a degree as to ward off visceral hyperæmias, from which certainly proceed the complications which are prone to bring about a fatal termination. Dr. Wilson's book is divided into seven chapters, which treat successively of the following diseases, *i. e.*: Simple Continued Fever, Influenza, Cerebro-spinal Fever, Enteric or Typhoid Fever, Typhus Fever, Relapsing Fever, Dengue. No classification is attempted, and for the reason that none is thus far placed on a scientific and well-recognized basis. Etiology should be the guiding principle in this matter, but our knowledge of the exciting causes of fevers is so limited as to preclude the possibility of a good division founded upon it. This we can scarcely admit to be correct. Some continued fevers are contagious, some are not. A few are connected solely with a miasmatic element; others are both miasmatic and contagious (Liebermeister).

In the first class the exanthematous fevers are properly embraced. In the second, dengue fever is included, and in the latter division we recognize typhoid fever and yellow fever. Why the author ignores absolutely a consideration of the eruptive fevers, including erysipelatous fever on the one hand, yellow fever on the other, he does not tell us and we are quite at a loss to appreciate his reasons. This is the more incomprehensible since he devotes 35 pages to the consideration of influenza (catarrhal fever) and 61 pages to cerebro-spinal fever (epidemic cerebro-spinal meningitis), which are not habitually described in chapters assigned to the continued fevers.

We approve highly, however, of the systematic manner in which each affection is portrayed, and particularly is this striking when the "analysis of symptoms" is considered at length after a fair, but brief, general description of the disease is given us under the head of "Clinical History." Simple Continued Fever is well written, and the author makes due acknowledgment to Ziemssen, Hirsch, Lewis Smith, Stillé, etc., but does not show that Dr. Wilson individually has cared for any of the cases which he describes. The opium treatment is the one most to be relied upon, but precaution should be observed when large and frequently repeated doses are given. The historical sketch of the disease is especially good, being, also, very complete and satisfactory in details. In the clinical history the author describes three varieties, the fulminant, the abortive, and the intermittent, which differ considerably from the ordinary forms. He objects very properly to the term "typhoid," as applied to certain grave cases on account of the confusion which has already arisen in regard to the connection between this disease and typhus fever.

In his historical sketch of Enteric Fever, Dr. Wilson pays a well-deserved tribute to Drs. Gerhard and Pennock, for their labours in first showing to Americans the points of wide divergence between this fever and Typhus. Enteric fever is endemic in North America over a wide extent of territory, and becomes predominant in large centres of population in proportion as wise sanitary regulations are neglected. Amongst the predisposing causes the influence of a dry, hot summer, and of adolescence

and early adult life, is particularly manifest. With the affluent the presence of stationary wash-basins, of bath-rooms and water-closets, is an additional danger of infection which the impoverished escape. The exciting cause of this fever has thus far eluded the most searching investigation, and it is known to us solely by its effects. Whilst this affirmation is unquestionably true, it is equally true that it is an organized germ.

Many properties of this germ are established, although its precise nature is not as yet determined. The author proceeds to enumerate these as follows:—

1. "It is invariably derived from a previous case of enteric fever.
2. "When introduced into the human body, it is, under favourable circumstances, capable of indefinitely reproducing itself.
3. "It is eliminated with the fecal discharges.
4. "It is not capable of producing enteric fever in other persons at once, but must undergo certain changes outside the body before it acquires this power.
5. "It retains its activity, when it finds its way into favourable situations, for a lengthened period after it has passed out of the body, the requirements to this end being decomposing animal matter, especially fecal discharges and moisture. Hence, cess-pools, sewers, drains, dung-heaps, wet manured soils, are its usual habitat.
6. "There is reason to believe that in such situations it is capable of reproducing itself.
7. "It remains suspended in, and may be conveyed by, water used for drinking purposes, and usually finds access to the body by this means.
8. "Suspended in the atmosphere, it also reaches the blood by means of the inspired air."

Facts and observations are given with ample details to corroborate the foregoing propositions. The clinical history, the analysis of the principal symptoms, the complications and sequels, the varieties, relapses, and anatomical lesions, are severally described in a clear and thorough manner, and will repay perusal as being a summary of the disease in these aspects, according to our most reliable and latest authorities. Under treatment we find some very sensible remarks in regard to prophylaxis. The views held of the general management of the patient are, also, judicious. The author insists upon care in diet, and refers to the pathological lesions which render watchfulness about the patients' food so essential. Special treatments by nitrate of silver (Pepper), calomel and iodine (Liebermeister), iodine and carbolic acid (Bartholow), are referred to with moderate commendation. We cannot agree with the author when he states that amongst methods of hydrotherapy, the cold bath is the most effective and least troublesome. Our feeling is, if we become affected with enteric fever, the same as that of Dr. Bristowe of London. "As to cold baths, I would rather not have them."

As soon, says Liebermeister, as 39.5° C. (103.1° F.) in the rectum, or 39.0° C. (102.2° F.) in the axilla, is reached, the bath is given. According to us this mode of treatment does not consider the fact that rise of temperature is essential to the normal march of enteric fever, and, therefore, seems irrational. And yet under the antipyretic treatment it is claimed by some eminent foreign observers that the mortality of enteric fever has immensely decreased (Liebermeister, Jurgensen, Brand). According to our experience this method may be suited to the enteric fever of Germany, but it certainly is not to the enteric fever of the United States, which is ordinarily of a milder type and requires less heroic management. Even the large doses of quinia which are given at intervals of 24 to 48

hours by those who have great confidence in the reduction of temperature by this means, do not appear wholly free from objections. Quinia reduces temperature in lowering heart action and arterial tension, and surely such result is not desirable when cardiac contractility is already greatly impaired.

In speaking of the use of digitalis the author states "it is *inadmissible* where the action of the heart is feeble." Special symptoms, complications, and sequels are to be treated in accordance with the general principles of therapeutics.

In his history of typhus fever the author gives a succinct, though complete account of different outbreaks of this dread disease. In many passages he cites the familiar names of Murchison, Hirsch, Clymer, Da Costa, etc. Whilst according to Lebert the exciting cause must be an organized germ, the exact nature of it is unknown. It is shown that typhus is pre-eminent contagious, and this is manifest "in proportion to the degree of intercourse between the healthy and the sick." In other words, the more protracted the time during which any one is exposed to foci of infection, the greater the probability of contracting this disease. Most epidemics of typhus tell the sorrowful tale of physicians, nurses, and others who have been in close attendance upon the sick being themselves sooner or later attacked. In 288 cases originating in the London Fever Hospital, 193 were nurses and other attendants in the wards. At the Salpêtrière in Paris, of the persons attached to the hospital 120 were attacked and 8 physicians died. The author properly objects to the term "*coma vigil*," being applied to two absolutely different conditions—and to its being neither explicit nor descriptive of any state. The general clinical description, as well as the more detailed analysis of special symptoms as referable to the different systems is methodical, correct, and in certain paragraphs written with considerable force and elegance, notably where the author portrays the *general appearance* of the patient ill of typhus fever.

A case is quoted from Da Costa to show how the characteristic eruptions of typhus and typhoid fevers may follow one another so closely as to occasion confusion in the mind of the observer in regard to the nature of the existing affection. Similar cases have been recorded by Murchison, Peacock, and MacLagen.

We commend highly the section upon treatment of typhus fever, which is explicit and judicious in most of its recommendations. We take exception, however, to an omission when the author recommends here without caution the use of digitalis as an antipyretic agent of value, whereas in enteric fever he considers its employment "*inadmissible* where the action of the heart is feeble." Now, then, the same acute granular degeneration of the cardiac muscular fibre is found as frequently in patients who die of typhus, as in those who die of enteric fever. For those who believe, as we do, that minute doses of digitalis are under these circumstances the most direct and best of all heart tonics, no such contra-indication exists either in the one case or in the other.

In the chapter on Diagnosis of Relapsing Fever, the author has wisely inserted a tabular statement which enables one, in a few moments, to estimate properly the great and essential differences which separate this disease, on the one hand from typhus, on the other from enteric fever. Clinically, relapsing and typhus fevers are certainly unlike, and the degree of their dissimilarity, as regards causation, future research will determine.

High temperature in this disease is certainly reduced by the use of cold baths and quinia, but evidence is lacking to show their influence in lessening the duration of the paroxysm, or preventing the relapse. The administration of parasitocides (sulphites, hyposulphites, chlorine) has been tried with indifferent success by Parry, and treatment on the expectant plan is upon the whole more satisfactory than any special form which has been recommended.

In concluding our notice of the author's work we take pleasure in commending it for accuracy in detail, method in arrangement, and thoroughness in research. We confess not to discover the evidence of the author's own experience in the large majority of his statements, but rather the proof of his industry. That he has read attentively, and wisely interpreted the works of distinguished authors in his chosen field of labour, we frankly acknowledge. But that he has recorded any individual views which are novel, we are compelled to deny. He has done well, however, in writing a work which supplies a certain want. We have no other systematic American work on fevers, full enough to satisfy practitioners, and at the same time brought up to the actual status of medical knowledge. For such Dr. Wilson's work is a reliable treatise. The only drawback is that the book cannot be procured without purchasing a full set of "Wood's Library of Standard Medical Authors."

B. R.

ART. XXII.—*Index-Catalogue of the Library of the Surgeon-General's Office, United States Army. Authors and Subjects.* Vol. II. Berlioz-Cholas. 4to. pp. [12] 990. Washington: Government Printing Office, 1881.

THE second volume of this stupendous enterprise well sustains the reputation of its predecessor, and tends to show that the expectations formed regarding it, exalted though they be, are likely to be fully satisfied by the completed work. We say they are likely to be satisfied, for the reason that we believe Congress has not yet appropriated sufficient funds for the completion of the arduous undertaking in which Dr. Billings has engaged.

To give some idea of the scope and thoroughness of the work, we will say that this second volume "includes 12,459 author-titles, representing 4934 volumes and 9810 pamphlets. It also includes 11,550 subject-titles of separate books and pamphlets, and 37,310 titles of articles in periodicals." Consisting of 990 pages, it progresses from "Berlioz" to "Cholas." Taking the subjects at hap-hazard, it will be found that 68 columns are devoted to "Bladder" and its sub-headings, 28 columns are given to "Cæsarean Section," 49 columns to "Cataract," while the bibliography of "Chloral" occupies $11\frac{1}{2}$ columns.

Sufficient has been said to show the great value of the second volume, and it remains but to add our sincere hope that Congress will furnish the funds and Dr. Billings enjoy the health to carry this invaluable work to a successful completion.

S. A.

ART. XXIII.—*Manual for the Physiological Laboratory.* By VINCENT HARRIS, M.D. (Lond.), M.R.C.P., Demonstrator of Physiology at St. Bartholomew's Hospital, etc., and D'ARCY POWER, B.A. Oxon., Assistant Demonstrator of Physiology at St. Bartholomew's Hospital. Crown 8vo. pp. 124. New York: Wm. Wood & Co., 1881.

It is the fashion in the English medical schools to separate histology from the chair of anatomy, to which it properly belongs, and to teach it in connection with physiology, with which it stands in no closer relationship than the coarser anatomy. Both anatomy and histology are merely descriptive of structure, and it seems strange that two divisions of one subject, both of which should be mastered before the study of function is attempted, should be separated by a line drawn at a point where the details of structure become microscopic.

The English schools, however, carry this peculiarity still further. We find that what are styled "Courses in Practical Physiology" are in all instances, with the exception, as far as we are aware, only of University College, London, and Trinity College, Cambridge, merely courses in histology, with the possible addition of a few simple exercises in physiological chemistry.

The *Manual for the Physiological Laboratory* of Messrs. Harris and Power furnishes an instance illustrative of this fact. It contains in all one hundred and thirteen pages, of which ninety-one are devoted to histology, and of the remainder, six are devoted to the simpler characteristics of proteids, one-half page to blood, one paragraph to bile, and one to the action of pancreatic juice, three pages to morbid and healthy urine, and two pages to glycogen, leucin, and tyrosin. About one-third of the pages in the book are blank.

Under the section of physiological chemistry the directions are so scanty as to render this portion of the book almost valueless for practical work by students. The histological section, as might be expected, is much more thorough, and generally, with the exception of the descriptions of the stomach and small intestine, in accord with recent observations. We cannot see that the book, as a manual for students of histology, possesses any great advantage over the many already published. R. M. S.

ART. XXIV.—*Public Health Papers and Reports, Vol. VI.* Presented at the eighth annual meeting of the American Public Health Association (New Orleans, La., Dec. 7-10), 1880, with an abstract of the record of proceedings. pp. 496. Boston, 1881.

THE remarkable success of the last meeting of our National Sanitary Association, held with justifiable triumph in New Orleans, that very home of the pestilence which the Society and its vigorous offspring, the National Board of Health, have done so much to baffle and control, is a fitting subject of congratulation among philanthropists throughout the world, and this goodly volume, presenting in admirable form the important papers and reports read before it, is a worthy monument of its eminently useful results.

After the thoughtful and scholarly address of the President, Dr. J. S. Billings, Surgeon U. S. A., we find placed in due prominence an exhaustive essay by Dr. T. J. Turner, U. S. Navy, which, as is well stated in the preface, will constitute for the present at least our chief authority upon the important questions forming its subject.

Public attention has been of late so generally aroused to the horrors of a steerage passage in our large emigrant steamers, that the accurate information and wise counsels of Dr. Turner, the outgrowth of life-long experience as a sailor, are at the present juncture of unusual interest, whilst the valuable appendices to his paper furnish certified facts which render his positions almost incontestable.

Dr. Henry B. Baker, the distinguished Michigan sanitarian, contributes an able essay upon the "Relations of Schools to Diphtheria, and to similar Diseases," which contains many suggestions in regard to this important branch of hygiene which concerns so vitally the entire coming generation of American men and women. Dr. Baker urges the appointment of sanitary inspectors of schools, who shall be executive officers of local boards of health; and he also advocates that most necessary precaution of isolating even the mildest cases of diphtheria (manifested by only a little sore-throat with slight fever), which experience has shown are fully capable of spreading the virulent contagion of this dreaded disease. Dr. Baker has added greatly to the value of his article as a popular educator by profusely illustrating it with improved charts, showing at a glance the prevalence and danger of diphtheria under various circumstances and in different seasons of the year.

An important addition to our knowledge respecting Dengue or break-bone fever is made by Dr. J. G. Thomas, of Savannah, Ga., in his essay upon this disease, which derives much of its present interest to the profession from its liability to become confounded, in some instances, with yellow fever. According to our author, it is to be distinguished from yellow fever by the absence of albumen in the urine, the infrequency of hemorrhage, and the low rate of mortality.

Valuable contributions from Dr. O. W. Wight, of Milwaukee, on the "Management of Contagious and Infectious Diseases in Milwaukee;" by Dr. Elisha Harris, of New York, on the "Domestic Pestilences viewed with Reference to our Warfare against them;" by Dr. Ezra M. Hunt, of New Jersey, "On our Present and our Needed Knowledge of Epidemics;" by Dr. G. B. Thornton, of Memphis, on "Memphis Sanitation and Quarantine, 1879 and 1880;" by Dr. Horatio R. Storer, of Rhode Island, on "Sanitary Protection in Newport;" by Dr. Jos. R. Smith, U. S. A., on "Disease among Texas Cattle;" a most important paper by Prof. Stanford E. Chaille, on "A Consideration of the Objections urged by some Evolutionists against Sanitary Laws, etc.," and by Dr. George M. Sternberg, U. S. A., on "Yellow Fever and Quarantine," all are worthy of extended notice did our limited space permit.

We cannot but regret that the *vis inertia* of the Association was so far allowed to control its action in regard to Dr. Albert L. Gihon's excellent "Report of the Committee on the Prevention of Venereal Diseases," and the very moderate recommendation which it contained. It seems to us, as we think it must to every advanced sanitarian, that the chief reason why wilful poisoning of others with the virus of various contagious diseases has not been declared criminal by our laws, is because legislators have been ignorant of its frequency and extent; and now that

scientific research has revealed its prevalence and supplied us with means for its detection, we consider that poisoning, whether with Paris green or with a Paris chancre, should be adjudged a capital crime, and be punished in extreme cases with the utmost severity.

J. G. R.

ART. XXV.—*The Disposal of the Dead. A Plea for Cremation.* By EDWARD J. BERMINGHAM, M.D., Fellow of the American and New York Academies of Medicine, etc. etc. pp. 89. New York, 1881.

THIS thin and loosely-printed volume has for its "mission" an exposition of the evils of inhumation, the removal of the prejudice against cremation, and the securing of new advocates for this system of disposing of the dead. Dr. Bermingham first reviews the various methods of treating human corpses among the ancients, and among savage nations, including burial in the earth or in natural caves, suspension in the air or in trees, immersion in the sea, mummification, etc. He next considers the dangers which arise from ordinary burial, stating that the diseases prevalent in and near graveyards are notably diarrhœa, dysentery, throat affections, and fevers, and quoting the observations of Darwin in regard to the agency of earth-worms in bringing quantities of earth which may be loaded with septic organisms from considerable depths to the surface of the ground, and the direct experiments of Pasteur, who proved that soil covering the carcass of an animal which had died two years before of splenic fever still contained the deadly bacteridium of Charbon.

Our author argues in favour of the cremation of dead animals, and of that bugbear of Boards of Health—refuse garbage; meets the religious objection that cremation would interfere with the resurrection of the body, with Lord Shaftesbury's pertinent inquiry, "In that case what would become of the holy Christian martyrs who were burned at the stake?" and concludes that the one real obstacle to cremation, that it would promote the concealment of the crime of murder, could be overcome by suitable legislation respecting its practice.

Dr. Bermingham's style is disfigured by some obviously laboured bursts of artificial eloquence, but he has nevertheless given us a useful and instructive essay upon the great sanitary reform which constitutes the subject of his work.

J. G. R.

ART. XXVI.—*Lectures on Syphilis, delivered at the Harveian Society, December, 1876.* By JAMES R. LANE, F.R.C.S., etc. Second edition. London: J. & A. Churchill, 1881. 8vo. pp. 95.

THE author, in a short preface, explains the object of these lectures to be to trace the progress of investigation in regard to venereal diseases during recent years, to indicate the points of general agreement, as well as those of difference, and to express impartially his own views. This purpose he has carried out in a very happy manner, writing from the standpoint of a "unicist," who holds that the "soft, suppurating sore" is sometimes followed by general manifestations of syphilis. The ground

for his opinion is stated thus: "I have repeatedly seen suppurating sores which I have had the opportunity of watching throughout their course, and which have never shown any induration *that I could discover* [italics our own], but which have nevertheless been followed in due course by constitutional disease." And, again, quoting the Medical Commission of 1864, he says: "Twenty-nine experienced witnesses gave evidence that sores, both soft and hard, may be followed by every variety of syphilitic eruption."

In all the discussions about the nature of the chancroid, soft chancre, suppurating sore, or whatever it may be called, we find unicists returning actually or practically to this untenable ground that every contagious sore upon the genitals that has not an indurated base is a soft chancre. Were this admitted, it would require no great experience to assert, and no one with any sense would deny, that the "soft chancre" is, not only sometimes, but often, followed by general syphilitic manifestations. Now, as far as the patient is concerned, it is all one whether the surgeon be a unicist and believe that the chancroid may be the initial lesion of syphilis, or be a dualist and believe that the initial lesion of syphilis may at times be indistinguishable by any physical characteristics from the chancroid. But in the interest of science it makes a great difference. The weakest point of the arguments in favour of unicism we believe to be the insisting upon resting the diagnosis of a certain venereal lesion upon the failure to discover one assumed physical characteristic of another, namely, induration. This is but negative evidence at best, and that of the weakest kind. Yet upon such a frail support rests a theory opposed alike to the dictates of reason and the results of the widest experience, namely, that the virus of a contagious, constitutional disease may communicate to a person as yet unattacked a purely local inflammation, which may, in time, communicate to a third the original constitutional disease. This is a way of putting the matter which, it appears to us, the unicists miss seeing. The question of induration as a sign of syphilis, to which they bring back the argument again and again, is as much settled in the negative for them as for dualists; and yet to this they return in all their experiments and observations. Dependence upon it is seen everywhere in their writings, in spite of open or implied disavowals of its importance.

Once let all syphilographers adopt the nomenclature of "initial lesion of syphilis" for such as are the first evidences of this constitutional disease, and "local venereal ulcer" for such as are not followed by it, and we would have a solid basis upon which to found experiments and observations. As it is, what can we argue from the testimony of one who founds a diagnosis, or excludes that of syphilis, upon the appearance of a single local lesion? How can we tell what he used when he says he inoculated an individual with syphilitic virus, knowing that he sometimes calls that syphilitic which never produces a remote manifestation? This is the reason for much of the confusion that exists in regard to the nature of syphilis. It takes some time for men to abandon terms to which they have been accustomed, and it will take time for all syphilographers to unite upon expressions which admit no possibility of misapprehension. When they do, however, we shall be able to banish the terms "dualism" and "unicism," and all will stand upon this plain platform:—There is a disease called syphilis, the initial lesion of which ordinarily presents certain specified characteristics; though these may be modified by numberless accidental influences, so that the most skilful observer shall fail to detect them. In

all such cases, however, the issue will prove the real nature of the lesion. Whatever it may resemble, it is an initial lesion of syphilis. It is the progeny and may be the parent of syphilis. Besides this, there are ulcerative lesions of the genitals due to irritating mechanical, chemical, or physiological influences, but purely local in their nature. These have nothing in common with syphilis except the accident of their location and ordinary method of acquisition. On account of this, however, and also of the fact that the modified initial lesion of syphilis sometimes closely resembles them, care should be exercised against making a false diagnosis of venereal lesions, and in consequence a false prognosis.

If this nomenclature were once generally adopted, and invariably used, the seeming differences among syphilographers would vanish. The facts are, on all sides, admitted. The author of the book before us describes the simulation of the "non-infecting chancre" (the local venereal ulcer) by the "true chancre" (the initial lesion of syphilis), and warns against misinterpreting either. Yet, that he himself has fallen into this error is clear from his statement that early mercurial treatment may avert "secondary infection." He himself says, a little further on, "there is really no absolute proof of the infecting nature of any given sore but the fact of infection itself."

In speaking of Boeck's process of syphilization he seems to fail to see the worthlessness, in an argument about unicism, of inoculations of a virus upon an individual already assumed to be saturated with it. He also practically indorses the illogical argument that because the inoculation of detritus from a syphilitic may occasion an ulcer looking like the chancroid, therefore this *is* a chancroid, and the chancroid is derivable from syphilis; and, because lesions resembling the chancroid are sometimes followed by syphilis, therefore the chancroid may be the parent of syphilis. In pathology things which appear to be equal to the same thing are by no means always equal to one another. And countless confirmations have established the fact that syphilis is always a constitutional disease—always derived from one who has, or will have, remote manifestations, and always communicating to a third the same constitutional disease that it was in the first or second.

Of the hypothetical "mixed chancre" of Rollet no better account could be given than we find here. Almost exactly as we have elsewhere expressed it do we find the author asserting that the initial lesion of syphilis ("indurated sore" he calls it, somewhat in contradiction to what he is explaining, namely, its occasional lack of induration) may be "excited to suppurate by the irritating properties of the soft matter placed upon it, *just as it would suppurate when irritated by a blister or by sarvine ointment.*" (Italics ours.) Here is the very point: that such a metamorphosis is not due to any specific property of the chancroid; that the chancroid has no specific property, but only a general irritating nature, which is common to many other materials. Such general irritants produce local lesions, but never, of themselves, constitutional disease.

Attention must be called to the fact that in the experiments of Auzias Turenne, in inoculating animals with syphilitic (?) matter, to which the author refers, only local lesions were produced.

The author in several points is compelled to express his dissent from the views of Mr. Hutchinson, who, in 1871, asserted that syphilis was a specific fever, like measles or smallpox; and, in 1874, that "mercury is the true *vital* and *physiological* antidote of the syphilitic virus;" and who very

recently uttered the opinion that "duality is dead,"—whatever that may mean. The author shows, from English proofs, how unfounded is another of his opinions, namely, that syphilis is, "with few exceptions, either directly or indirectly, the parent of all phagedæna."

Mr. Lane is of those who believe that there is no such thing as a "specific" gonorrhœal poison; that gonorrhœa is a simple inflammation of a mucous membrane. He believes that syphilis is curable—not a peculiar belief nowadays—and, of course, in reinfection. In regard to the "infecting" properties of the secretions of syphilitics, he offers no decided opinion, though he seems not to hold very firmly the view that no unmixed physiological secretion can communicate syphilis.

The chapter on Hereditary Syphilis is very interesting. The author has never been convinced that the so-called Hutchinson teeth are pathognomonic of congenital (he means *inherited*) syphilis, and he agrees "with Mr. Lee that much unhappiness may be occasioned in families by the too ready assumption that they are invariably so caused."

The chapter on Visceral Syphilis concludes with a timely caution against *post hoc, propter hoc* arguments.

And here, though much more might be said, we must conclude our review. We have not hesitated to state positively our dissent from the author's opinions in regard to the nature of the so-called chancroid, and our deprecation of the logical methods of all unicists; nevertheless we most heartily commend the book before us to thoughtful medical men. It is a book to be read, not only for the important lessons it teaches, but for the careful and conscientious spirit which is everywhere manifest in it. It is a book of the sort which gives one a feeling of regard as well as respect for the personally unknown author.¹

C. W. D.

ART. XXVII.—*Dangers to Health: A Pictorial Guide to Domestic Sanitary Defects.* By T. PRIDGIN TEALE, M.A., Surgeon to the General Infirmary at Leeds. Third edition. 8vo. pp. 170, with 70 Lithographic Plates (mostly coloured). London: J. & A. Churchill, 1881.

As an evidence of the increased popular demand for information upon sanitary topics, we have to note the appearance of the third edition of Mr. T. Pridgin Teale's work on "Dangers to Health," just published by J. & A. Churchill, of London, the first edition having been issued about two and a half years ago. It belongs to a class of books, so popular of late, which are designed to convey instruction in matters pertaining to the every-day affairs of life. The method of attaining this object is particularly well chosen by Mr. Teale, as by means of coloured illustrations, with brief explanatory notes, the facts intended to be set forth are comprehended at a glance. The general public have not the time nor the patience to expend upon general treatises on sanitary science; their special interest is in matters relating to the sanitary arrangements of their homes, and any

¹ In the review of Dr. Tartenson's book on syphilis in this JOURNAL for July, 1881, the word "dualist" is twice found where the word "unicist" should have been. The first instance is at the beginning of third paragraph on page 228, which should read: "owing to the fact that Tartenson is a *unicist*, etc." Again, on the next to the last line of page 228, the reading should be: "This strikes us as an example of the customary logic of the *unicists*."

C. W. D.

work that points out in a plain and simple manner *what to do* and *what to avoid* in sanitary construction will strike a popular vein and meet with encouragement. This is the chief secret of the success of Mr. Teale's book.

Our author tells us in his introduction that the design which he has set before him is to represent pictorially every important fault to which domestic sanitary arrangements are liable, so far at least as his information avails him, and to point out the consequences of such defects by instances of the illness produced thereby. We first notice sixteen "sanitary maxims"—added to the work since the first edition was published—which embody sound, practical advice for the householder. They serve as a text for the work, and very properly preface the illustrations. The endorsement of the "National Health Society," London, which has published copies for sale and distribution, is a sufficient guarantee of their correctness. The action of this society in making use of such a means of enlightening the public is not unlike that recently taken by the Department of Health of New York City, in preparing a series of seventeen rules¹ pertaining to drainage and plumbing which are to be a guide in all plans of construction, and is to be commended.

This edition contains seventy plates, which is an increase of fifteen over the number at first presented. Six of the old illustrations have been replaced by new and better ones. The illustrations are principally devoted to the portrayal of every defect in drainage that is likely to occur in and about our houses, the greater number of them very properly being confined to those faults most commonly met with. The evils resulting from bad ventilation and from accumulation of refuse matter about town houses also receive a share of attention. Finally, the author has appended to the pictorial portion of the work a catalogue of additional "defects" with brief descriptions, which were either difficult of illustration, or which, if illustrated, would have too greatly increased the price of the book. As it is, this appendix has greatly extended the scope of the work without materially advancing its cost.

As the illustrations are the distinguishing feature of the work, we may remark that Mr. Teale has by their use succeeded in producing a most instructive and in every way admirable guide to domestic sanitary defects. It abounds in hints which may be taken in at a glance, not a little of their value depending on the fact that they are founded upon actual occurrences, and not on vague speculations. The medical practitioner as well as the householder, landlord, and all who have to do with the sanitary construction and management of houses, will find this book of the greatest service.

It will be observed in glancing over the illustrations that, while there is a full display of the ordinary sanitary defects, but little attempt has been made to show how these faults are to be corrected, except in a very general way. This seeming defect in the work has taken place with the author's full knowledge, for, as he tells us in his preface, he has mainly accomplished the purpose of the book by pointing out the faults, leaving their correction to the intelligence and self-interest of the individual, who will naturally seek the advice of some expert or sanitary engineer. It would be difficult and perhaps unnecessary to designate how the various faults ought to be rectified—as, in the first place, conditions of locality and construction

¹ The San. Engineer, vol. 4, No. xix. p. 446.

would have to be considered, and moreover there might be a trenching "on matters concerning which there may be various solutions, various opinions, and changes in course of time." And, in the second place, the pictures themselves, in most cases, suggest in a plain manner the proper remedies to adopt.

Mr. Teale has been particularly felicitous in the manner in which he has grouped together the material for the presentation of many of his sketches. He has certainly succeeded in bringing home to his readers, "in a telling and unmistakable way," the great dangers to which dwellers in houses are so very liable from defects in drainage arrangements. The effect of a study of these sketches is to arouse a feeling of insecurity, and to provoke a diligent inquiry into the sanitary condition of one's own house. This is the prime object of the work, and if intelligent action shall follow upon the conviction that defects exist which tend to place health in jeopardy, then its philanthropic mission will be accomplished. This book is welcomed as a weapon in the hands of the public with which to combat dishonest builders of "bonus-houses" and unscrupulous speculators in human lives, and as a fund of information on practical matters for the enlightenment of the people, enabling them to pass judgment upon the vital points of sanitary construction, and thus protect themselves against the blunders and scamped-work of incompetent and dishonest mechanics.

The book contains a copious index and table of contents, and its mechanical execution is highly creditable to the publishers. W. H. F.

ART. XXVIII.—*Lectures on Digestion; An Introduction to the Clinical Study of Diseases of the Digestive Organs.* By Dr. C. A. EWALD, Lecturer in the Royal University of Berlin. Translated by ROBERT SAUNDY, M.D., Edinburgh. Crown 8vo. pp. 149. New York: Wm. Wood & Co., 1881.

DURING the winter of 1878-79, Dr. Ewald delivered a course of twelve lectures to the physicians of Berlin on the Physiology of Digestion, in which the interests of physicians and clinicists received the first consideration, and the arrangement and treatment of the subject matter in this little book, which is the English translation of these lectures, is therefore from their point of view.

Dr. Ewald's former position as clinical assistant to Prof. Frerichs, himself one of the classical authorities on the physiology of digestion, is a guarantee as to the author's familiarity with the practical side of his subject, while his numerous and valuable original investigations in the domain of the physiology of digestion make him an authority from the scientific point of view.

It is needless, therefore, to refer to the contents of these lectures, other than to state that they are fully in accord with the standing of the science at the date of publication, and form the very best guide for the physician with which we are acquainted, the last lecture on Foods being especially excellent. We find it difficult, however, to explain Dr. Ewald's statement on page 55, that peptone does not furnish the xanthoproteic or Mil-

lon's reaction—a statement in direct contradiction to all experience, and which, if correct, would exclude peptone from the group of proteids. Dr. Saundby has greatly added to the value of the book by his fluent translation, in which the foreign idiom is entirely avoided. R. M. S.

ART. XXIX.—*Sanitary and Statistical Report of the Surgeon-General of the Navy, for the year 1879.* 8vo. pp. 361. Washington: Government Printing Office, 1881.

DR. PHILIP S. WALES, Surgeon-General of the Navy (appointed January, 1880), submitted to the Secretary of the Navy, November 1, 1880, his report for the year ending December 31, 1879.

It is of course a compilation from reports of many medical officers attached either to cruising ships or fixed stations. The work was probably done under a necessity of completing it at an over-near date, amidst routine office work daily claiming attention and dispatch. Under different circumstances it might possibly have been made shorter, and, in this sense, more acceptable to most readers. Government official reports, generally speaking, are prolix. They might say less, and yet tell more; many who are desirous to acquire the substance of their contents must do so at the least cost of time and labour, or not at all.

This report, designed to enlighten chiefly those Congressmen and officials whose duty requires them to read it, is likely to be more satisfactory in many respects to those of the profession generally who may consult it than previous annual reports from the same office. The arrangement of the materials is better, and bears internally suggestion of improvement in the future.

Those fiscal matters which are under the management of the Bureau of Medicine and Surgery are presented first in tables of estimates and appropriations. Next, it is stated that "the insane of the navy," in the Government Hospital for the Insane, numbered 41 September 30, 1879; and 40, September 30, 1880, 12 having been admitted and 13 discharged during the year.

The sanitary condition of the entire naval service, ashore and afloat, is stated: 468 patients continued from the preceding year; 13,983 admitted; 12,459 returned to duty; 1415 invalided; 96 died, leaving 481 under treatment at the end of the year. Tables showing the aggregate number of cases afloat, at hospitals and at stations, follow.

It is supposed that the laws restrict the number of enlisted men for the naval service to 7500 sailors, and about 1500 marines. The number of officers of all grades on the active list is about 1800; on the retired list, 290; marine corps, 90; and cadets at the Naval Academy, say 220, making in round numbers an aggregate of 11,310 persons who may need medical or surgical care.

The Surgeon-General says the number of persons employed afloat during 1879 was 10,388—"corrected for time, 8869."

The sanitary condition of the "force afloat" is represented in tables exhibiting the number of patients in each squadron, the classes of diseases,

mortality, etc., of each, with incidental comments. The vaccination of 3545 persons is reported. In this connection the Surgeon-General remarks: "The care taken to protect sailors from smallpox by vaccination results undoubtedly in incalculable advantage, and, it may be said, has almost completely stamped this disease out of the navy. The cases reported were seven in number, or 1.01 per M., occurring in ships lying in infected ports."

The section of the report which contains most of interest to the profession generally is that on recruiting.

Medical-Director Gihon reports the results of the physical examination of 6129 lads, candidates for admission to and pupils in the Naval Academy, with a view to fixing a standard of physical measurement for the admission of cadets and apprentices to the naval service. In each case he has tabulated the *weight* of the nude body; *height* from vertex to soles; *circumference of thorax* over the nipples; *expansion*, or difference between maximum and minimum girth; *vital capacity* as indicated by Hutchinson's spirometer; and *strength* as shown by a spring dynamometer, with the age of the examinee.

In compiling and tabulating these observations, Dr. Gihon has taken every precaution necessary to avoid error. His well-done work is an important and valuable contribution to vital statistics.

Surgeon J. S. Knight and Past Assistant-Surgeon Magruder contribute very interesting observations in connection with the enlistment of apprentices. The latter states that the most frequent cause of rejection of lads seeking to enter the navy as apprentices is "irritable heart," which he attributes either to the use of tobacco or to masturbation.

There are some very valuable remarks and suggestions in connection with the importance of a thorough chemical and microscopic examination of atmospheric air, by the Surgeon-General and Drs. J. H. Kidder and Flint, with a detailed description of the method proposed for conducting observations over an extensive field.

Surgeon J. H. Kidder presents observations on the nutritive value of the naval ration in connection with the sustenance and growth of men and apprentice boys.

Reports on the sanitary condition of the several stations follow. The general report of each squadron is accompanied by a report of the sanitary condition and hygienic circumstances of each vessel included in it, as well as on the medical topography of ports visited by them. An outline map, showing the geographical limits of the station, and tracings exhibiting a synoptical view of the atmospheric conditions on each ship during the year, with the places visited, etc., illustrate each report. The hospitals, navy yards, etc., within the bounds of each station, are considered in the report in connection with it.

The report of Medical-Director Albert L. Gihon on the sanitary condition of the Naval Academy at Annapolis embraces, among other hygienic matters, a statement of his opinion based on personal observation during five years as the health officer of the institution, "that beyond all other things the future health and usefulness of the lads educated at this school require the absolute interdiction of tobacco." This opinion is sustained by arguments which will be accepted as conclusive by all physicians and sanitarians; but they may be nevertheless without influence on those who have authority to prohibit the use of tobacco by all naval cadets.

Our limits do not permit mention of very many interesting subjects which are ably presented in this report by competent observers. No better evidence is needed, we take leave to say in passing, of the beneficial influence of competitive examinations—inaugurated 1824—for the admission and promotion of medical officers of the navy, than is exhibited in the quality of their contributions to this report. By the labour he has bestowed upon it, Dr. Wales has won a clear title to the approbation of the naval service.

Larger type where very small is used, and paper of better quality might have been employed. The report is intrinsically worthy of a much better presentation and binding than the Government Printing Office has bestowed upon it.

W. S. W. R.

ART. XXX.—*A Text-book of Human Physiology. Designed for the Use of Practitioners and Students of Medicine.* By AUSTIN FLINT, Jr., M.D. 3d edition, 8vo. pp. 948. New York: D. Appleton & Co., 1881.

THE appearance of the third edition of this well-known text-book is an evidence that the author has shown good judgment in the adoption of the plan on which it is based, and ability in putting it into execution. It is a work based on the French rather than the German school. The subjects are treated after the natural history method and are almost encyclopedic in their completeness. With all the evident care to bring the work up to the times, it is unfortunate that more space was not allotted the important subjects of blood pressure and electrotonus. The chapter on embryology is in like manner unsatisfactory. It reflects none of the remarkable progress made in this branch of physiology during the last seven years.

H. A.

ART. XXXI.—*A Practical Treatise on Surgical Diagnosis, designed as a Manual for Practitioners and Students.* By AMBROSE L. RANNEY, A.M., M.D., etc. Second edition, enlarged and revised. 8vo. pp. xiii., 471. New York: William Wood and Company, 1880.

WHEN we prepared a short notice of the first edition of this book, eighteen months since, we ventured to express some doubts we entertained concerning the plan adopted by Dr. Ranney, and questioned whether it would be found satisfactory. Within a little more than a year, however, a second edition has been called for, and the book has been considerably enlarged, having grown from three hundred and eighty-six to four hundred and seventy-one pages, the additions consisting to a good degree of descriptive text; indeed, Dr. Ranney tells us that he has changed his "opinion somewhat since this work was first issued, as to the advisability of employing the plan of contrast of symptoms, in the form of differential tables, to the exclusion of descriptive text." The enlargement which this conclusion has led to, has very materially enhanced the value of the work. Some errors of statement have been corrected, and although some

remain, as will be the case in any uninspired volume, there is a manifest improvement. Successive revisions of a book, which seems likely to be popular, will doubtless still further indicate progress. The description of rickets is one which will bear revision. The new index which has been prepared is a decided improvement over the last. We think that the value of the book as a work of reference would be enhanced were catch words printed at the head of each page.

We incline to the opinion that this volume of Dr. Ranney's will be of special service to lecturers upon surgery, and were we called upon to prepare a course of such lectures, we should instinctively turn to this book as a very suitable skeleton upon which to build a superstructure, and we should, under such circumstances, gladly use many of the excellent symptomatic tables contained in it.

The book is well printed, upon good paper, and is bound in exceptionally heavy bevelled boards.

S. A.

ART. XXXII.—*The Microscope and its Revelations.* By WILLIAM B. CARPENTER, C.B., M.D., F.R.S., etc. etc. Sixth edition. Illustrated by 26 plates and 500 wood engravings. Pp. 882. Philadelphia: Presley Blakiston, 1881.

WHEN an encyclopædia of Microscopy like this has been endorsed by the tens of thousands of purchasers required to carry it to a sixth edition, there can be but one opinion respecting its intrinsic value, and the chief duty of a reviewer is to determine whether it has been kept abreast of the advancing science whereof it treats. This we find its indefatigable and industrious author has faithfully done, and we must conscientiously recommend the book to every microscopist as a necessary implement towards his satisfactory progress.

We observe Dr. Carpenter still esteems the Podura scale as the best test for practical working lenses; but on page 205 he states its true structure is still a subject of discussion, although further on in the volume he expresses his own conviction that the well-known "exclamation markings" are "the optical expression of a corrugated or ribbed arrangement of the lower membrane of the scale, slightly modified by the internal structure of the upper membrane," in opposition to the doctrine of Dr. Royston Pigott, that "they are altogether false and illusory." Dr. Carpenter seems to be quite ignorant of the curiously-conclusive demonstration of the true nature of these markings, announced by Prof. J. W. S. Arnold, M.D., of New York, who by the ingenious method of carbonizing a scale, and then breaking it by pressure under a thin glass cover, obtained several perfectly distinct and isolated "exclamation marks," photographs of which are now in our possession, and absolutely prove that these objects are separate entities, and not mere optical illusions.

J. G. R.

QUARTERLY SUMMARY
OF THE
IMPROVEMENTS AND DISCOVERIES
IN THE
MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

The Development of the Retina.

The investigations of Löwe apparently showed that the retina of mammalian animals is developed in a manner diametrically opposite to that of birds and batrachian reptiles. This remarkable conclusion, exceptional as it is to the general laws of development, has led to an extended investigation of the subject by OGNEFF, of Moscow, who has arrived at the opinion that the appearances seen by Löwe are for the most part the result of his method of treatment, which is ill-suited to so delicate a structure as the embryonal retina. Löwe distinguished in the earliest stage of development four layers—(1) the external limiting membrane; (2) a layer of clear elements, not everywhere continuous; (3) a layer of small, round, dark, radiating bodies; (4) a clear homogeneous mass, in which here and there indications of a radiating striation could be perceived. But Ogneff finds at this period only spindle-shaped cells, with oval nuclei and a fine ring of protoplasm, from each extremity of which processes extend. Here and there on the outer surface were large clear cells, with roundish nuclei. No special limiting membranes could be perceived. The first visible change consists in a division of the innermost cells, which also become large and round, with more conspicuous nuclei and more numerous processes, of which the inner curve round and run parallel with the inner surface of the retina. These are, without doubt, the earliest appearance of the nerve fibres. The processes of the outer layer of cells can be clearly traced through the whole thickness of the retina, and some of these processes are thickened at the extremity—the embryonal form of Müller's fibres, which Löwe states do not appear until a much later period. The clear elements on the outer surface described by him could not be discovered by Ogneff at this period. The further changes in the retina consist in this, that between the embryonal nerve fibres and the spindle cells lying immediately outside them appears a narrow streak, the indication of the molecular layer. It is interrupted in places by the two cellular layers. From what the substance of this layer is developed, Ogneff could not discern; but it appears to consist of numerous nerve-cell processes and the embryonal Müller's fibres and other fibres which run vertically, these fibrillary elements being accompanied by extremely fine granules, easily separated by maceration in water. It does not at this period appear to contain a special spongy substance. Subsequently these layers, and especially the molecular and nerve-cell layers, undergo further development. They become more

sharply limited, and increase in thickness. In the former free nuclei become visible, and also roundish cells, which are irregularly scattered in the mammalia, but arranged in series in pigeons. The differentiation of the retina terminates with the appearance of the rods and with the two granular layers. The rods are not formed, as Löwe asserts, beneath the external limiting membrane, but appear opposite the processes of the cells which lie on the outer part of the retina. The separation of the two granular layers commences just before the appearance of the rods; the cells in the outer part of the retina divide and become much smaller, but those lying most deeply are rather larger than the others, and roundish. From this description it appears that the process of development of the mammalian retina occurs in the same manner as in birds and batrachia.—*Lancet*, Sept. 3, 1881.

MATERIA MEDICA AND THERAPEUTICS.

Action and Uses of Antipyretic Medicines, including the Influence exerted by Medicines administered internally upon Septicæmia and Allied Conditions.

In a paper with this title read at the London Congress, Prof. BINZ summarized his views as follows:—

1. In the present state of our knowledge, there are two modes in which antipyretic remedies may be conceived to operate: first, by increasing the discharge of the pyrexial heat; secondly, by checking its production.

2. The quantity of heat discharged may be augmented by direct withdrawal (tepid water), or by facilitating the circulation through the skin (digitalis, cutaneous irritants).

3. Heat production may be lessened by repeated cooling of the surface, and especially by the internal use of anti-zymotics.

4. Febrile diseases commonly owe their origin to the introduction and rapid development of substances akin to ferments. Several of these have been shown to resemble yeast in being low vegetable organisms, or derived from such organisms. They enter the glands, where they undergo multiplication, increase the metabolic processes, generate products of decomposition which exert a paralyzing action on the nervous system, and raise the standard of temperature throughout the body.

5. Owing to impaired action of the heart in certain stages of the disorder, or to contraction of the cutaneous vessels, the skin becomes anæmic, and gives off less heat than usual. The internal temperature rises accordingly.

6. Quinine, our chief anti-pyretic, acts by directly combating the efficient cause of the disorder, and by checking the abnormal metabolism going on in the body. The nervous system takes no part, or only a secondary part, in this operation. In intermittent fevers, quinine prevents the paroxysms by attacking their infective cause. The paroxysms are not the essence—the substantive element—of the disease; they are only a symptom of it. The substantive element is the poison deposited in the colourless corpuscles of many organs, especially the spleen. There are fevers without paroxysms, and paroxysms without fever. It is just those intermittent fevers which run their course without paroxysms that are the most malignant. The malarial poison rapidly causes disintegration of the tissues and the blood, and so paralyzes the nerve-centres.

7. The reduction of acute splenic tumours by quinine depends upon the adverse influence exerted by the alkaloid on the infective poison to which the morbid over-action of the spleen and its consequent enlargement are due. “*Cessante*

causâ cessat effectus." Even a healthy spleen may be reduced in size by large doses of quinine; the alkaloid vigorously checking the oxidation of its principal elements, the colourless corpuscles. Quinine has no direct influence on the vaso-motor nerves.

8. Quinine attacks the malarial poison with especial energy; on this fact depends the so-called specific action of quinine in intermittent fevers. The same relation, but in a minor degree, subsists between quinine and the infective poison of enteric fever, between mercury and iodine and the poison of syphilis, between salicylic acid and the "irritant" in acute articular rheumatism.

9. An antipyretic which, in one disease, instantaneously arrests the fever, may be wholly powerless in another. The difference depends on the fact that the various anti-zymotics act very unequally on the individual *schizomycetes* and ferments; one will paralyze them rapidly, by another they will hardly be affected.

10. The past history of therapeutics, and recent achievements in the domain of etiology and pharmacology, entitle us to assume that by persistent scientific inquiry and practical observation, we may succeed in discovering a specific antidote for every species of infective or septicæmic malady.

Prof. FOKKER, of Groningen, held that, while there is no great difficulty in understanding the mode of action of simple refrigeration in the treatment of pyrexia, that of antipyretic remedies, administered internally, is still obscure. We must assume, either that they lower the temperature of the body by interfering with the circulation, or that they exert a destructive action, in virtue of their antiseptic properties, on the humble organisms to which the pyrexial phenomena are presumably due. The second of these hypotheses is the more likely one of the two. It may, of course, be objected that such remedies can never be administered in sufficient quantity to insure their presence in the blood in such proportions as to render it aseptic, or, at any rate, to exercise an antiseptic influence. But it must not be forgotten that the organisms in question have to maintain a "struggle for life" in the interior of the body; so that any hostile factor, though unable of itself to check their multiplication, may succeed in doing so when combined with others equally hostile to bacterial life. It is quite possible, moreover, that antipyretic medicines may accumulate in particular organs, which may then exert a disinfectant influence upon the blood.

Antipyretic remedies may legitimately be given in febrile maladies, when the heat of the body is such as to directly threaten the patient's life, or even the integrity of his tissues. Under such circumstances, those aromatic remedies which are, at the same time, bacterial poisons, should be preferred to physical methods of refrigeration. But when the temperature of the body does not rise to a dangerous height, the employment of such remedies in antipyretic doses is undesirable; since we have experimental evidence to show that a degree of heat only a little above the normal temperature of the body is injurious to the vitality or the virulence of the pathogenic organisms. It is quite possible, indeed, that the febrile heat may be one way in which the system reacts against these organisms, and tends towards recovery. In all cases, therefore, when the temperature does not rise so high as to be of itself a source of danger, physical refrigeration should be avoided, and the antipyretic remedies, whose twofold mode of action has been alluded to above, should only be prescribed in relatively small doses, such as are inadequate to reduce the heat of the body.

Utility of Strychnia as an Expectorant.

The experiments of Prokop Rokitanski have shown that strychnia is a powerful stimulant of the respiratory centres. Dr. MILNER FOTHERGILL, in a paper

read at the London Congress, stated that, without acquaintance with his experiments, he arrived, independently, at the same conclusions, from experiments upon rabbits. When the respiratory centre was paralyzed by aconite, the injection of strychnia exercised a most potent influence in restoring the respiration. Clinical observation corroborates this view; and, at the Hospital for Diseases of the Chest, he has found strychnia most useful when the respiration was embarrassed. In acute bronchitis, when the act of expectoration is difficult, it is useful. In chronic bronchitis and emphysema it relieves the labouring respiration, and, when the right ventricle is dilated, adds to the efficacy of digitalis most usefully. In lung consolidation it is also of service; indeed, in all cases where the number of respirations mounts over the ordinary proportion to the beats of the heart (about four to one), it has seemed to me to be of the greatest utility.

MEDICINE.

Typhoid Fever considered as Fecal Intoxication.

Dr. JULES GUÉRIN, of Paris, read a paper on this subject at the London Congress, of which the following is an abstract:—

For a long time the deposits of human excrement were considered to be susceptible to contribute to the development of typhoid fever. This opinion, expressed with a certain character of generality, and, besides, deprived of any serious demonstration, had remained in conflict with all opinions of the same kind. Up to what point was it founded? In what measure, under what form, in what conditions, could the fecal excretions have a share in producing typhoid fever? In order to elucidate, if not to solve, these various questions, the author of this work has given himself up to experiments on animals, and to clinical researches, which have led him to the following conclusions:—

1. The specific diarrhœic matter of those affected with enteric fever, contains at its exit from the body toxic elements resulting from the fermentation of fecal matters, retained and accumulated at the end of the small intestine, behind the ileo-cæcal valve.
2. The organic lesions, considered heretofore as specific signs of typhoid fever, congestion, ulceration of the mucous membrane, alterations of the glands of Brunner, Peyer's patches, and mesenteric glands, are effects of the virulent and ulcerative action of typhoid matters on these parts; and the functional troubles, or general symptoms of the illness, are at the same time the result of the penetration of these same matters into the organism, and of the organic changes which they determine.
3. The complications which present themselves in the course of typhoid fever, under the form of meningitis, pleurisy, pneumonia, and other marked affections, are only more distinct localizations of its poisonous principle, just as those illnesses which begin at the outset with typhoid symptoms, are in themselves nothing but primitive effects of fecal poisoning.
4. Typhoid poison engendered by fecal fermentations, spreads itself incessantly abroad by all the excretory ways of the body, from whence the transmissibility of the illness, and the formation of seats of infection, susceptible of reproducing it in an endemic and epidemic form.

Every one of these propositions has been the object of experiments, and of clinical and anatomo-pathological observations, stated in three memoirs read before the Academy of Science and Medicine in Paris, in the years 1877 and 1878, with proofs to the point. The author will reproduce both before the Fourth

Section of the International Congress, and will accompany them by observations and new experiments, which have only tended to confirm him in his opinion.

Existence of Two Distinct Forms of Eruptive Fever, usually included under the head of Measles, and the Relation to them of so-called Rubeola or Rötheln.

Dr. W. B. CHEADLE, of London, at the London Congress, read a paper with the above title, of which the following is an abstract:—

That one attack of a contagious exanthem confers upon the individual who experiences it immunity from any further attack of the same disease is a rule which has been found to hold good with regard to measles as generally as it does in the case of scarlatina or smallpox.

Yet in two recent epidemics, both of them of severe and pronounced type, which followed one another in the same district within the year, it was found that the individuals who suffered in the first epidemic obtained no immunity from the second; and, further, that no previous attacks whatever of ordinary measles exercised any protective power against the second epidemic. Of thirty cases of this second epidemic, in which absolutely reliable histories could be obtained, twenty-two of the patients had had measles before, and ten of these under the author's personal observation, within the year.

Certain deviations from the common type, such as a shorter period of incubation, severe laryngeal symptoms, and other special features, taken together with the fact that previous attacks of ordinary measles conferred no protection, prove the disease of the second epidemic to be an essentially distinct exanthem. The question then arises whether it was a new and unrecognized form of eruptive fever, or the only other known form of measles, Rötheln. The exceptionally severe and even malignant character of the disease at the outset would seem to negative the idea of Rötheln, which is always described as a disease of an invariably mild type. But after weighing all the facts, the conclusion is arrived at that the disease was Rötheln, which prevails not only in the slight form which is acknowledged, but in a severe and malignant form also, hitherto not recognized as Rötheln, but erroneously described as an exceptionally severe variety of common measles.

Real Position of Rötheln, Rubeola, or "German Measles."

Dr. WILLIAM SQUIRE, in a paper read at the London Congress, gave a short historical survey of the literature of this disease, and showed that it was known before it received a distinctive name.

The disease, in his opinion, has but a superficial resemblance to scarlet fever, but has close relations to measles in several points. But it is self-protective, is as distinct from measles as varicella is from variola, and possesses all the marks of a specific disease. It is contagious; it runs a definite course; it occurs but once in the same person.

Dr. KASSOWITZ stated that, 1. In the epidemics of rötheln which have come under his observation, he has never noticed the affection passing into true measles.

2. The resemblance to measles is, nevertheless, sometimes so marked, both as regards the eruption and the associated phenomena, that in any single case the distinction from the milder form of measles, which runs a rapid course, is rendered extremely difficult, and, in such circumstances, can generally only be made by having regard to other cases in the same house and family.

3. If this affection has any special relationship to any other acute exanthem, it is to measles, not to scarlet fever, that it is allied.

Dr. J. LEWIS SMITH, of New York, drew the conclusion from a study of a large number of cases, mainly occurring in two epidemics observed by himself, that Rôtheln is a distinct specific disorder.

It is an exanthematic fever, mildly contagious. It resembles varicella in general mildness of symptoms, in the absence of dangerous complications, or sequelæ, and in the uniformly favourable prognosis; while its symptoms and history show a resemblance to measles and scarlet fever.

Its incubative period varies from seven, or perhaps fewer, to twenty-one days.

Rôtheln requires no treatment.

Local Treatment of Diphtheria.

Dr. MORELL MACKENZIE, of London, discussed the important subject of the local treatment of diphtheria at the London Congress, and the following is a summary of his views:—

1. *Ice* useful in first stage, both internally and applied externally to the neck, contra-indicated when it causes pain, in young children, in advanced stages, and especially if gangrene be present.

2. *Steam inhalations* are of great service when the false membrane shows a disposition to separate, and when it is situate in the larynx or trachea.

3. *Solvents* administered by swabbing, or in the form of spray, are often highly beneficial. Lime-water and lactic acid the best.

4. *Antiseptics* are very important: carbolic acid, permanganate of potash, and chloral hydrate; the last being the most certain.

5. *Antaerics*, or *varnishes*, *i. e.*, remedies which exclude the air from the false membrane. Tolu dissolved in ether is the most serviceable; simultaneous employment of other local remedies (ice, steam) not prevented by the use of these agents.

6. *Caustics* are always injurious, whilst *astringents* are useless and sometimes hurtful.

Mr. LENNOX BROWNE, of London, expressed his preference for lactic acid as a solvent, and urged the constant use of ice, and of beverages containing chlorate of potash, the last measure acting constitutionally as well as locally.

Removal of enlarged tonsils he also advocated even during an attack of diphtheria, as a local measure calculated to have the best results; (1) as removing an impediment to the respiration; (2) as preventing the downward progress of exudation; and (3) as an early substitute for, or prevention of, the more dangerous measure of opening the windpipe.

Subcutaneous Nodules connected with Fibrous Structures Occurring in Children the Subjects of Chorea and Rheumatism.

Drs. THOMAS BARLOW and FRANCIS WARNER called the attention of the members of the London Congress to certain nodules varying in size from that of a mustard seed to that of a bitter almond, which are strictly subcutaneous, the skin over them being simply raised, and without any heat, pain, redness, or infiltration. In most situations they are slightly movable. They occur in connection with fasciæ and tendons, and especially near joints. The back of the elbow, the malleoli, and the margins of the patella are the commonest sites. Other situations are the neighbourhood of the vertebral spines, the spine of the scapula, the cresta illi, the extensor tendons of the foot and hand, the temporal ridge, and the superior curved line of the occiput. They are mostly symmetrical.

In regard to minute structure, they consist of small masses of loose fibrous bundles, sometimes very vascular.

In regard to evolution: 1. These nodules may appear in one crop, *i. e.*, several nodules appear simultaneously in different parts of the body. 2. Successive nodules may appear. 3. The nodules subside generally within a period of two months. 4. They may partially subside, and then undergo recrudescence. 5. After complete subsidence, so far as manipulation can determine, a new crop may appear. 6. They never become bony, and never become infiltrated with urate of soda. 7. Their evolution is not attended with pain, and rarely with marked pyrexia. Often during the time when they are present there is no pyrexia.

These nodules are to be clearly distinguished from—(a) The *nodi digitorum* of Heberden. (b) Gouty nodules. (c) Erythema nodosum. (d) Syphilomata. (e) Scrofulides.

In regard to age, they have been observed by us only in children and young adults, the limits being $4\frac{1}{2}$ years and 19 years.

In regard to sex, out of 26 cases 17 were female, 9 were male. In all the cases it was believed there was heart affection.

13 out of the 26 cases had well-marked chorea; 8 had erythema marginatum, or erythema papulatum; 1 had purpura in addition.

There was a history of acute rheumatism, in 10, and of subacute rheumatism with vague joint pains, in 8.

It is submitted—1. That these subcutaneous nodules may be taken as indicative of rheumatism in children. 2. That when found associated with heart disease and chorea, although no history of rheumatic fever can be obtained, nevertheless their presence gives a presumption that the chorea is rheumatic. 3. That in regard to prognosis and treatment, although the nodules are unimportant in themselves, they are nevertheless of serious import, because in several cases the associated heart disease has been found actively progressive. 4. That in nature they are probably homologous with the inflammatory exudation which forms the basis of a vegetation on a cardiac valve.

On Rheumatism, Gout, and Rheumatic Gout.

In a thoughtful communication presented by Mr. JONATHAN HUTCHINSON, at the London Congress, the following propositions were made.

That rheumatism is, in the main, a liability to joint-disease, brought about by exposure to cold and wet, through reflex nervous influences. (A catarrhal arthritis.)

That gout is, in the main, a liability to joint-disease, brought about by certain articles of food, by defects of assimilation and of excretion. (A humoral arthritis.)

That in each disease, although the joints suffer most prominently, they by no means suffer alone.

That in each, by transmission through many generations, a diathesis is formed which is heritable, and which gives peculiarity to the diseases from which its subjects may suffer, and which stamps them as "gouty" or "rheumatic."

That gout and rheumatism are very frequently present together. Rheumatism is very often met with without gout, but gout is seldom present without rheumatism. Sometimes the two exist side by side, and attack the same patient at different times, but more frequently they become mixed and produce a hybrid disease. (Rheumatic gout.)

In connection with hereditary descent, various maladies are to be affiliated with gout and rheumatic gout, which differ somewhat from both—certain forms of iritis; hemorrhagic retinitis; universal crippling rheumatism (chronic rheumatoid arthritis); some forms of glaucoma, lumbago, sciatica, and neuralgia; *nodi digitorum*, and possibly hæmophilia.

On Certain little recognized Phases of Tabes Dorsalis (Locomotor Ataxy).

Dr. THOMAS BUZZARD, of London, in a paper presented at the recent Medical Congress, at London, drew attention to the overwhelming prominence amongst the symptoms which has been given both by Romberg and Duchenne (de Boulogne) to the incoordination of movement often observed in tabes dorsalis. In consequence of this, the symptom (which is very frequently absent) has come to be regarded as the essential one, and to many persons the idea never occurs that a patient who has no ataxy may be an example of the disease. So it comes to pass that any one symptom which happens to be more than usually prominent is apt to absorb the attention, and the ailment is probably referred to some widely different pathological condition. The author accepts Westphal's symptom (the absence of the knee-phenomenon) along with good voluntary power in the anterior muscles of the thigh, as almost positive evidence of the existence of tabes dorsalis when it is associated with any one or more of the recognized symptoms. In illustration of the tendency there is for tabes to be overlooked if no ataxy be present, he relates five cases in which the *crises gastriques* (of Charcot) were so strongly marked as to monopolize attention, which would hardly have happened had the symptom from which Duchenne named the disease been present. In one of these the author found absence of knee-phenomenon, pupils small, contracting in accommodation, but not to light, lightning pains, along with the gastric crises; but this latter symptom was so predominant that the case was subsequently pronounced by others to be one of cancer of the stomach, notwithstanding that the gastric symptoms had existed paroxysmally for fifteen years. In another, correctly diagnosed as tabes dorsalis, and shown to him by Mr. Herbert Page, to whom the patient had applied on account of joint-disease in the foot, there was a history of obstinate vomiting and epigastric pain of at least three months' duration. (The case afforded another example of that remarkable association of tabetic arthropathy with gastric crises to which the author directed attention in February, 1880.¹) It is suggested that many cases of so-called "gout in the stomach" may probably be examples of the gastric crises of tabes, as well as some which are supposed to be due to intestinal obstruction.

A like prominence of some other symptoms of tabes may equally absorb attention. Pierret's view that the disease is essentially a chronic inflammation of sensory fibres is adopted, and it is urged that, just as optic atrophy may be the dominating symptom in some cases, so atrophy of the auditory nerve may be the prominent one in others, and thus many cases of so-called "nervous deafness" may prove to be examples of tabes dorsalis. Reference is made to a case in which stone in the bladder was the first symptom of tabes dorsalis. The bladder-trouble may be more than usually pronounced, and lead to retention of urine and accumulation of mucus, in which a phosphatic calculus is easily formed. The urgent symptoms produced by this will easily conceal the general disorder which lies behind.

The Exciting Cause of Hysteria and Hystero-Epilepsy.

Dr. GRAILY HEWITT, of London, read a paper at the London Congress, the object of which was to demonstrate by the results of clinical observation that in cases of hysteria and so-called hystero-epilepsy the exciting cause of the attacks

¹ Cases of osseous and articular lesions in tabes dorsalis. Transactions of the Pathological Society of London, 1880.

is distortion of the uterus produced by flexion of the uterus upon itself either forwards or backwards.

The attacks are the result of reflex irritation, the irritation consisting in the physical compression and tension of the tissues of the uterus consequent on the forcible bending of the body of the uterus on the cervix. This bending has the effect of producing compression of the uterine tissues at and near the angle of flexion, and, by its interference with the circulation in the uterine tissues, it has the further effect of producing a continuous congestion of the body of the uterus.

The evidence offered by the author in support of the above explanation is the recital of eighteen cases observed by him during a period of ten years. In these cases, some of which were cases of severe attacks of hysteria, others identical with those described as cases of hysterio-epilepsy, and a few in which the symptoms were of a less severe character, the condition of the uterus was carefully investigated.

Marked distortion of the uterus was present in all the cases, the most severe cases being those in which the uterine distortion was greatest.

Complete relief from the attacks and hysterical symptoms was obtained in these cases by a treatment directed to the removal of the uterine distortion. Out of eighteen cases perfect relief is known to have been obtained in seventeen; the subsequent history is not fully known in one case.

Of the eighteen cases related, twelve were cases of ante flexion of the uterus, and six were cases of retro flexion.

The complete cessation of the hysterical symptoms in the cases related, and the uniform success of treatment directed to the rectification of the shape and position of the uterus, conclusively show, in the author's opinion, that the exciting cause of the attacks was the flexed condition of the uterus.

On Infective Nephritis.

Prof. BOUCHARD, of Paris, read a paper at the late International Medical Congress at London, of which the following is an abstract:—

It is well known that albuminuria, generally transitory, occurs in the course of a large number of infective diseases. It is also known that in a certain number of these diseases, uræmic symptoms, and in several of them, the lesions of nephritis have been observed. It is known, then, that in infective diseases symptoms of a nephritis may supervene, which the autopsy confirms.

These kidney affections, occurring in infective diseases, are infective inflammations of the kidney, or Infective Nephritis. This is established by the following grounds:—

1. During life, the same infective agent which occurs in the blood, and the morbid fluids, is also found in the urine.

2. This infective agent is only found in urines which contain albumen, and elements which indicate a lesion of the kidney.

3. This infective agent disappears from the urine at the same time as the albumen disappears.

4. In fatal cases the same agents are found abundantly in the renal tissue.

5. Finally, in all the cases about which the above assertions are made, the kidney is found to present the anatomical characters of a nephritis.

Every case of albuminuria which occurs in an infective disease is not necessarily due to infective nephritis, or to nephritis of any kind. Albuminuria may be either thus produced, or may be dyscrasic. The albumen in these two kinds of albuminuria presents different physical characters. Infective nephritis, with the above characters, has been already ascertained to exist in fifteen infective diseases. Infective nephritis may be the starting point of chronic nephritis. The urine may be one of the means by which infective diseases are transmitted.

SURGERY.

Nature of the so-called Surgical Fever.

General attention was first directed by Sir James Paget, in 1864, to the peculiar liability of patients to be attacked with scarlet fever after operations. The fact has been confirmed by subsequent observations. Mr. HOWARD MARSH, in a paper read at the London Congress, presented a digest of the evidence bearing on this subject afforded by the Hospital for Sick Children, and by cases collected elsewhere; and the following points he relied on to prove that although instances are not rare in which eruptions unconnected with, though somewhat like, scarlet fever, are seen after operation, many of the cases are true scarlet fever.

The frequency of the cases at the Children's Hospital when scarlet fever was treated under the same roof with surgical cases; and the rarity of cases at the present time, when scarlet fever is admitted into a separate building.

That though when they are attacked patients are placed in the fever ward, they suffer no further contagion.

That though many cases are imperfectly marked, some are severe and even fatal, and fully typical of scarlet fever.

That the cases are more frequent during epidemics of scarlet fever than at other periods.

That cases have occurred in which, on very clear evidence as to the manner of infection, typical scarlet fever has been developed a very few hours after an operation had been performed.

Considering the disease to be true, though in many instances, modified, scarlet fever, the writer proceeds to examine the general question as to the manner in which scarlet fever, and other specific diseases, are liable to be modified by the circumstances under which they are developed. Reference is incidentally made to the point that scarlet fever appears to stand alone in its tendency to attack patients directly after operations.

The Antiseptic Treatment in Abdominal Surgery.

In the course of a discussion in the Surgical Section of the London Congress on recent advances in the surgical treatment of intra-peritoneal tumours, some interesting remarks were elicited concerning antiseptic surgery.

Dr. KEITH stated (*Lancet*, Aug. 13, 1881) that the antiseptic method had many warm supporters, but after having a succession of eighty successful cases, he had five deaths in the next twenty-five cases, two from carbolic poisoning, and one from septicæmia, and two from acute nephritis. On account of this mortality; and of the very frequent high temperature the evening after the operation, he had abandoned the spray in all operations, and had had one death out of twenty-seven ovariectomies without the antiseptic treatment.

Prof. LISTER stated in reference to Dr. Keith's experience, that he had dissuaded him from using antiseptics in the first instance; in such an operation there is abundant room for effusion and means of absorption, while carbolic acid both increases the one and lessens the other; but on the whole he thought antiseptic ovariectomy had been successful. Referring to the experiments detailed at Cambridge which showed that diluted septic poison may be added without effect to blood serum, though not to diluted blood serum, he further recited more recent experiments which showed that blood-clot in the body is still less favourable to the development of organisms. He expressed his belief that it is "solid bits of dirt" that are the deleterious agents, and that possibly too much atten-

tion has been paid to the finest particles floating in the air. His own results, however, were so good that he shrank from giving up any one of the details of the treatment by which he obtained them, although he quite admitted that he too might at some future time be able to say "*fort mit dem spray*"; at present he could not accept irrigation as a substitute for the spray. He denied that there was any ground for the charge that he disregarded the general condition of the patient or his hygienic surroundings. Were this true, his results being so good as admitted by all, what a strong argument it afforded to the efficacy of his merely local treatment.

The *Lancet* says there was not time for Professor Lister to touch upon the many points raised by previous speakers. If we were to attempt to give in a few words the general impression produced by the debate, we should say that the value of antiseptics was clearly recognized by all, that it was made evident that Professor Lister's aim may be attained by means other and simpler than his; that in particular the value of the spray is considered very doubtful; but more than all, that antiseptic treatment only answers one of the requirements of wound treatment, and that he only is a scientific surgeon who enlarges his views and practice to embrace all.

The Causes of Failure in Obtaining Primary Union in Operation Wounds.

Prof. G. M. HUMPHRY, of Cambridge, discussed this important subject in a paper read at the London Congress. He considered the following points:—

1. The delicacy and sensitiveness of the tissues in infantile and early life, which renders them liable to inflammation and ulceration upon slight irritation.
2. The deficiency of the nutritive energy requisite for the healing processes in the atonic and aged, evinced most especially in the lower limbs, when there is disease of the arteries.
3. The presence of foreign substances in the wound, especially blood or bloody fluid, which separates the surfaces, and has, further, a tendency to decomposition.

Cut surfaces placed in apposition, and kept so, unite, unless there is some cause preventing union; witness wounds of the face, and other parts, in which there is little opportunity for the accumulation of fluid between the surfaces, and in which primary union usually takes place.

The methods most calculated to secure primary union are, therefore, those which maintain the apposition of the cut surfaces most effectually, and with least irritation, and which provide against the presence of blood or bloody fluid in the wound—sutures of such material, and applied in such manner as is least likely to cause irritation—quietude of the part, gentle, uniform pressure, and fixing on a splint where that can be done.

The effusion of blood into the wound after it has been stitched up is best prevented by carefully securing the vessels with ligature, or by torsion. Ligatures are easily applied, are almost unfailing, and are attended with little or no ill effect; the material of which they are made, together with the tissue included in them, undergoes absorption, so that it is immaterial how many are applied. The actual cautery may be used freely as an adjunct. The sponging of the wound will promote oozing at the time, and tends to lessen the risk of it afterwards. Insert drainage tube and express the blood from the wound as long as it continues to flow through the tube after the wound has been stitched up.

Antiseptics are an additional precaution, preventing the decomposition of any bloody fluid which, in spite of the above-named precautions, may be effused into the wound. They are especially valuable when cavities are opened.

Esmarch's band promotes bleeding from cut surfaces soon after its removal, but rather lessens the risk of subsequent effusion.

Some Observations on Wounds Inflicted by the Bullets of the Martini-Henry Rifle.

Mr. T. LONGMORE, Surgeon-General of the British Army, in some observations on this subject at the London Congress, said that in the summer of 1879, Dr. Kirker, R. N., brought to his notice some observations he had made experimentally on certain differences in the characters of wounds inflicted by spherical bullets, and those by conoidal bullets. These differences were quite reconcilable with the conditions of the experiments instituted, especially as regards the nature of the objects fired at, the relative dimensions and weights of the projectiles employed, and the distances at which the objects were hit by them.

One of the observations made by Dr. Kirker was, that, though bones penetrated by the conoidal bullets were extensively fissured, the periosteal investment of the fragments was not much disturbed; and Dr. Kirker was led to surmise that, in some instances, the cures without suppuration of fractures of bones caused by conoidal bullets, which had been attributed to special modes of treatment, might have been chiefly due to the fragments having been maintained *in situ* in the manner just mentioned.

That fractures of long bones by conoidal bullets are usually accompanied by extensive fissures, and that some of the fissured fragments are held *in situ* by the periosteum, are acknowledged facts; but that the maintenance of the fragments by their periosteal covering should occur so largely as to enable the wound to become healed without suppuration was new to Mr. Longmore.

It occurred to Mr. Longmore that it might be useful to carry out a few experiments with the hardened bullet of the Martini-Henry rifle in present use, for the purpose of comparing its effects with those of the bullet used by Dr. Kirker, as described by him, and also with the effects previously observed by himself of the Enfield rifle bullet. It was particularly as to the amount of local comminution of the bone, and the extent to which the fissured fragments were kept *in situ* by the periosteum, that he thought observations might be useful.

The results of these trials Mr. Longmore accordingly made were briefly as follows:—

1. The Martini-Henry bullet causes considerably more laceration and contusion of the soft tissues, with all comminution and displacement of bone at the site of impact, than were observed in the experiments described by Dr. Kirker.

2. The area of comminution is not so extensive, and generally the fragments are not so widely scattered, with the Martini-Henry bullet, as occurred in corresponding experiments made by Mr. Longmore with the Enfield rifle bullet, .55 inch in diameter, of soft lead.

3. A larger proportion of displaced fragments at the part of the bone struck by the Martini-Henry projectile, retain their periosteal connection than when the Enfield rifle bullet was used; while long fragments, above and below the site of impact, though detached by fissuring from the adjoining bone surfaces, are maintained in close apposition by the periosteal investment.

4. It was noticed, in one experiment, that though fissures extended completely through the apophysis of the bone, the synovial membrane, covering the joint surface, remained intact. The fissures extended to the joint, but the joint was not opened.

Conclusions: The state of the bone wounded by the hardened Martini-Henry projectile appears to offer more opportunities of repair than if the fracture had been caused by an Enfield rifle soft leaden bullet.

When the grave importance of the long fissured fragments being retained in juxtaposition, and in their normal relation to the shaft of the fractured bone is

remembered, and the further importance of the periosteum covering them being kept intact; these experiments point very strongly to the urgent necessity of immobilizing such fractures from the onset.

The special importance of immobilizing gunshot fractures, which are supposed to be accompanied with fissures extending into a neighbouring joint, is also rendered very manifest: for in any case where the extremity of the bone is split, but the synovial capsule of the articulation happens to be still complete, it is obvious that a small amount of rough movement may cause the synovial membrane to be torn along the line of fissure in the bone, and a communication to be established between the seat of fracture and the interior of the joint. The gravity of the injury would be very largely increased should this happen.

Removal of the Entire Tongue with Scissors through the Mouth.

Mr. WALTER WHITEHEAD, Surgeon to the Manchester Royal Infirmary, on November 3, 1877, removed the whole of the tongue through the mouth with scissors (*vide Brit. Med. Journ.*, December 8, 1877, p. 303) which is believed to be the first instance of the entire tongue having been removed for disease through the mouth by simple excision. More than thirty tongues have since been removed by the same plan. In a paper presented to the London Congress Mr. Whitehead made a study of these cases. The operation is conducted in six stages after the following simple manner: 1. The mouth is opened to the full extent with a suitable gag; and the duty of attending to this is entrusted to one of the two assistants required. 2. The tongue is drawn out of the mouth by a double ligature passed through its substance an inch from the tip. 3. The operator commences by dividing all the attachments of the tongue to the jaw and to the pillars of the fauces. 4. The muscles attached to the base of the tongue are then cut across by a series of successive short snips of the scissors until the entire tongue is separated on the plane of the inferior border of the lower jaw, and as far back as the safety of the epiglottis will permit. 5. The lingual or any other arteries requiring torsion are twisted as divided. 6. A single loop of silk is passed by a long needle through the remains of the glosso-epiglottidean fold of mucous membrane, as a means of drawing forwards the floor of the mouth should secondary hemorrhage take place.

The patient is fed for the first three days by nutritive enemata; satisfying thirst by occasionally washing out the mouth with a weak iced solution of permanganate of potash. The difficulties and dangers of the operation are few. Hemorrhage is easily controllable. I have twice removed the entire tongue without having to secure a single vessel, and more than once have only had to twist one lingual artery.

A table of twenty-eight cases, with one death the immediate result of the operation (an old man æt. 69) accompanies the paper. Two other deaths occurred in consequence of the operation, but from remote causes.

Taking the most unfavourable estimate, the deaths in the twenty-eight cases do not amount to 11 per cent., and, when contrasted with the 30 to 60 per cent. of deaths resulting from removal of the tongue by any other operation, I venture to affirm that substantial evidence has been submitted in favour of the removal of the tongue with scissors.

Indications for Extra- or Intra-Laryngeal Treatment of Growths in the Larynx.

Curious difference of opinion between surgeons and laryngologists exists on this question, and there is considerable difficulty in giving, at the present time, final and accurately determined indications for certain doubtful categories.

Prof. BUROW, of Königsberg, at the London Congress laid down the following propositions on this subject.

Every benign laryngeal tumour ought, if possible, to be removed per vias naturales ; and only if an experienced laryngologist has established the inexpediency of this method may the extra-laryngeal be adopted. Of this the following forms are to be considered ; Thyrotomy, total and partial ; opening of the crico-thyroid ligament, and sub-hyoid pharyngotomy.

Total thyrotomy is an operation more endangering life than is commonly supposed. Percentage of mortality augmented by four per cent. by communication of bad results, obtained by others and the author.

Thyrotomy protects as little against recurrence as does the endo-laryngeal method (in papillomatous disease). It endangers, to a high degree, the subsequent re-establishment of the function of the organ by injury to the vocal cords, cicatricial contraction, etc. *The facilitation of the removal of the tumour is by no means so great* as one might believe *à priori*, in consequence of insufficient separation of the alæ of the thyroid cartilage, hemorrhage, great sensibility, etc.

Partial thyrotomy is entirely to be repudiated, on account of the insufficient space obtained by it.

Also, as to comparative quickness of cure, thyrotomy is not superior to endo-laryngeal method, as the former confines the patients to bed and house, whilst the latter permits them to follow their occupation.

Certain qualities of growths, supposed by many to be sufficient indications per se for the adoption of extra-laryngeal method are, as a rule, only so, if they occur, not separately but several of them together. Such are broad bases, unusual hardness of consistency, origin in the ventricles, great size, multiplicity (in papillomata), even situation beneath the glottis. In the majority of cases these difficulties can be overcome by sufficient persistence and employment of suitable instruments, and especially of the galvano-cautery. In proper cases *the division of the crico-thyroid ligament is much to be recommended*—an operation which is much too rarely performed at the present time, especially in sub-glottic tumours, but which is suitable also in polypi originating from the free border, or from the upper surface of the vocal cord, if they have a long and movable pedicle. *Sub-hyoid pharyngotomy gives a good means of approach to tumours of the upper laryngeal cavity*, especially to those originating from the epiglottis. In children, the tumours most frequently found are papillomata ; here neither method can boast of very good results. *One should always try the endo-laryngeal method in children also* ; if this be impracticable, one should tracheotomize children from 6 to 8 years old, if dyspnoea be present, and try to operate one or two years later *per vias naturales*. In infants thyrotomy is to be practised, tracheotomy having been previously performed.

Recent Advances in Abdominal Surgery.

Mr. LAWSON TAIT drew the attention of the London Congress to certain advances in abdominal surgery, which he regards as the outcome of the increase in the success of ovariectomy, which he attributes to increased attention to hygiene and to the intraperitoneal method of operating.

He has, in papers already published, laid down the principle that every clearly non-malignant tumour of the abdomen or pelvis, which presents a likelihood of destroying the patient, or which, by reason of suffering caused by it, greatly interferes with the comfort of life, should be investigated by an exploratory incision. Acting upon this, he has opened the abdomen in many cases which until recently were not regarded as within the province of surgical effort. Amongst these were included one case of gallstone, five cases of hydatids of the liver, one case of large

cyst of the liver, six cases of cysts of the kidneys, one case of abscess of the spleen, twelve cases of abscess of the pelvis, four cases of suppuration of the Fallopian tube, and six cases of Fallopian pregnancy. Of these thirty-six cases only one died, that being a case of Fallopian pregnancy, in which the child is still living, the mother being at the time of the operation too far exhausted for recovery to be hoped for.

The principles of the operations in such cases were : First, to operate before the patient was hopelessly exhausted ; secondly, to open the abdomen carefully in the middle line ; thirdly, to take the utmost care that none of the contents of the cavities attacked should be allowed to enter the peritoneal cavity ; fourthly, to completely close the peritoneal cavity under all circumstances, that being done by uniting the wound in the tumour by a continuous suture to the wound in the abdominal wall when it was necessary to drain the cavity ; fifthly, scrupulous attention to the proper isolation of the patient from all insanitary and poisonous influences. The author has in a few of these cases attempted to employ the Listerian details, but he found them cumbrous and impracticable, and that the patients recovered perfectly well without them, and that the employment of carbolic acid rather impeded recovery than aided it.

Extirpation of the Kidney.

Prof. CZERNY, in a paper read before the International Congress at London, presented the following conclusions :—

1. Extirpation of one kidney is indicated in cases of wound of the kidney, floating kidney, pyonephrosis, calculous pyelitis, cysts, and hydro-nephrosis, tumours, and fistulae communicating with the ureter ; as soon as the life of the individual is endangered, and other methods of treatment prove ineffectual, provided that the other kidney is sound.

2. Nephrectomy can be performed, by an abdominal section which involves opening the peritoneum, or by means of a lumbar incision which leaves the peritoneum intact. The first method is suitable for cases of movable kidney ; the other is indicated when the kidney is quite fixed, or nearly so.

3. The lumbar incision is the safer of the two plans, and therefore is worthy of further development.

4. The best method of dealing with the pedicle is to carefully ligature it, and cut it short, adopting antiseptic precautions.

5. Incision of cyst and stitching its margin to the skin is the best plan of treatment in cases of fixed hydro-nephroses, empyema of the pelvis of the kidney, and echinococcus of the kidney.

6. The plan of catheterizing the ureters of women and constricting the ureters of men, in order to confirm the diagnosis of disease affecting one kidney only, has not been sufficiently practised, and deserves a wider employment, aided, perhaps, by the use of the endoscope at the same time.

Nephrectomy for Nephrolithiasis.

Mr. BARWELL reported at the London Congress the following interesting case :—

Dennis F—, aged eighteen, was under my care, October, 1880, with a left lumbar abscess, diagnosed as perinephritic, probably depending on calculus. The abscess was widely opened. He improved in health. No leave for further measures was obtained. He was discharged in January, 1881, but kept under observation.

1881. *March 29.* The lad was readmitted, having suffered more, and lost flesh considerably. His temperature was very hectic. In April Mr. Barwell sounded through the persistent sinus, and detected a stone.

May 5. Leave for further procedure was obtained. The difficulties foreseen were from proximity of twelfth rib to the crest of the ilium, and from amount of dense cicatricial tissue. Patient, when etherized, was laid across a thick sand-bag, so as to bend spine forwards and to the right. Mr. B. made the usual oblique incision, but the scar-tissue so obscured parts he could not trust them as guides to the kidney. He followed the sinus with his finger, detected the stone, and, passing the knife along the digit, laid the gland bare, obtaining more room by running the scalpel along lower border of last rib. An attempt to remove the stone failed, but produced some bleeding, restrained by pressure, while he quickly enucleated the hard body enough to pass a silk ligature over it, and tie it near its calyx; bleeding being thus checked, the rest was more carefully peeled away, until he could feel the pedicle isolated and distinct. A second cord was passed in the same way in front of the kidney, and tied round the pedicle *en masse*. There was not room to remove the organ entire. He cut it in two with scissors in the depth of the wound, severed each portion from the tied stalk, and removed them separately.

The boy's temperature after the first night steadily improved. A good deal of albumen was in the urine at first; but regulation of diet has cured this condition. A piece of sloughed ureter $4\frac{1}{2}$ inches long, with the ligatures attached, came away on the forty-sixth day.

June 22. The boy is well in health. Has gained flesh. Temperature normal. Only a minute wound remains.

Partial Excision of the Bladder.

Dr. ADOLPH FISCHER, of Buda Pesth, presented a paper on this subject at the London Congress, which embraced the results of some interesting experimental observations. In order to answer on the ground of practical experience the following questions, he has excised larger or smaller portions from the bladder of seven dogs.

1. Is it necessary in operating on dogs to take strict antiseptic precautions?
2. Is the operation attended by great dangers, and has the wound of the bladder, if properly stitched, a tendency to heal?
3. Which material, and which kind of suture is the most suitable?

Four of the seven dogs recovered.

The first two were operated upon antiseptically; one died. *Post-mortem*.—Sutures not accurate; peritonitis.

The second two not strictly antiseptically; one died on the third day with a high temperature. *Post-mortem*.—Hemorrhage into the peritoneal cavity.

Three dogs operated upon not antiseptically at all; one died. In the fatal case Dr. Fischer had excised a considerable part from the trigonum vesicæ. *Post-mortem*.—Gangrene of the bladder.

The material for sutures was Lister's antiseptic silk, silk boiled in five per cent. carbolic lotion, and catgut. Each of these materials answered well. Dr. Fischer used the interrupted and the combined suture, and a modification of my own, the combined interrupted suture.

From these experiments the following deductions may be drawn:—

1. In operating on dogs antiseptic precautions are not absolutely necessary.
2. Wounds in the bladder, which are afterwards carefully united by sutures, are not particularly dangerous.
3. Good results are principally dependent upon the accuracy of the suture.

There can be no doubt that this operation is more likely to be successful on the human subject, because it can be done antiseptically; the bladder can be subjected to a mechanical treatment (irrigation with antiseptic fluids); a catheter can be kept in the bladder, and absolute rest can be secured.

The indications for partial excision of the human bladder may be brought at present under the following heads:—

1. Traumatic injuries to the bladder with contused edges.
 2. Diverticula of the bladder, containing encysted calculi.
 3. General dilatation of the bladder, when the cause of the disease has either been removed or is removable.
 4. Benign and malignant tumours involving the wall of the bladder.
 5. Vesico-abdominal, vesico-vaginal, and recto-vesical fistula.
 6. Destructive ulcerations threatening rupture, and withstanding other methods of treatment.
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Treatment of Scrofulous Inflammation of Joints.

Prof. HUETER read a paper at the London Congress on this subject, of which the following is an abstract:—

1. Scrofulous inflammation of a joint is characterized by the formation of granulation tissue, so that suppuration follows,—while in other forms of joint inflammation, especially the traumatic form, suppuration precedes, this formation of granulation tissue.

2. Scrofulous inflammation can be described as leading to the formation of granulations, as a synovitis granulosa, if it proceeds from the synovial membrane; as a myelitis granulosa, if granulation masses are previously formed in the medullary substance of the bones (of the joint). In the latter case, the synovitis granulosa follows the myelitis granulosa.

3. In the scrofulous granulations, “noxæ” develop themselves, which, at the seat of the primary disease, lead to the formation of tubercles (local tuberculosis of joints), and by getting into the bloodvessels, produce general tuberculosis (lungs, and other organs).

4. This form of joint-inflammation may, therefore, be called the scrofulo-tubercular.

5. That form of joint-inflammation, which is produced by congenital syphilis, shows similar appearances; it must, nevertheless, be differentiated, both for diagnostic and prognostic purposes, since there are no “noxæ” which can lead to tuberculosis.

6. The early stage of scrofulous inflammation may be successfully treated by the injection of a 3–5 per cent. solution of carbolic acid. The injection must be made with a Pravaz syringe, in such a way that the solution comes in immediate contact with the granulation tissue, *i. e.*, with the interior of the joint, if the case is one of synovitis granulosa, and with the interior of the bone, if it be one of myelitis granulosa.

7. Antiphlogistic treatment of scrofulous joints (fixation, massage, compression, permanent extension, blood-letting, blistering), is of little or no value.

8. Incision into the joints, drainage, scraping away the granulations, or partial venesection of a joint, are to be discarded.

9. Carbolic injections having failed, excision is the best treatment, especially after suppuration has set in.

10 and 11. Excision should be total. When practised early, the results are the most satisfactory.

12. Scrofulous manifestations (local) after excision, are best treated by the application of the actual cautery, and the dusting on of iodoform; or by the introduction of iodoform crayons into the fistulous openings.

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On the Results of the Treatment in Chronic Diseases of the Knee-Joint, including an Account of Fifty Resections of the Joint.

Prof. KOCHER, of Berne, was the author of a paper presented at the London Congress, which contained the following practical conclusions:—

1. Amputation of the thigh is indicated in cases where white swelling occurs in patients suffering from tuberculosis of the internal organs, or those whom the disease has rendered very anæmic, or who present a constant high temperature, or are reduced by prolonged suppuration.

2. Resection is the best treatment in all other cases, if contraction of the joint or considerable functional disturbance have occurred.

3. Under these circumstances resection gives in every way better results than are obtained from conservative treatment.

4. Resection should be only resorted to in exceptional cases in childhood or advanced age. The results are as good or better as regards union of the ends of the bones in adult life than in childhood.

5. The mortality since the author commenced the practice of resection has only been 12 per cent.; and now, thanks to the recent improvements and the introduction of antiseptics, the operation has become free from danger.

6. His present endeavour is so to improve the method, that movable, and at the same time firm, joints may be secured.

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On the Treatment of Aneurism by Esmarch's Elastic Bandage.

Mr. EDWARD BELLAMY, Surgeon to the Charing-Cross Hospital, London, presented a note on this subject to the London Congress. From the consideration of four cases under his care, in three of which the bandage had utterly failed, he considers those in which the aneurism is of rapid development, and the sac is highly compressible, and where there are decided heart complications, as quite unamenable to the bandage pressure treatment.

In three of the cases alluded to, all of popliteal aneurism, and one of very recent standing, the aneurismal sac became evidently rapidly expanded during treatment, and thinned, and threatened giving way; faintness came on after the pressure had been applied but a short time. They all recovered rapidly after ligature of the superficial femoral.

The fourth case, also of popliteal aneurism, in which the use of Esmarch's bandage succeeded, was of a very different type; the walls were hard, and but slightly compressible, with but little distension, and, most probably, cure had already commenced before the treatment was undertaken. There were no heart symptoms, and the aneurism was of long standing.

The evidence, it must be granted, from these four cases, is negative.

A fifth case under the author's care, of carotid aneurism, was treated partially successfully by digital pressure and Esmarch's bandage; but he is inclined to consider the good done to be entirely due to the digital element.

The method would seem to be effective in cases of equable expansion, and commencing spontaneous cure by fibrinous deposit, by causing the further approximation of the inner wall of the sac and its contents.

The "Modus Operandi" of Esmarch's Elastic Bandage in the Treatment of Aneurism.

Mr. A. PEARCE GOULD, Assistant-Surgeon to Westminster Hospital, London, read a paper on this subject, of which the following is a summary, at the late London Congress:—

1. It is first pointed out that while other methods of treatment—Ligature, Instrumental and Digital Compression, Flexion—lessen or entirely stop the flow of blood through part or parts of the main blood-channel, they do not interfere with the blood-current in secondary vessels, or control the anastomotie circulation. Esmarch's Elastic Bandage, on the other hand, when firmly applied, stops the circulation in all the vessels of the part.

2. It is next shown that the cure of an aneurism is brought about by the obliteration of its cavity, either by fibrin, or by clotted blood, and subsequent organization of the same.

3. The conditions leading to the deposit of fibrin are discussed, the main condition being shown to be contact of moving blood with foreign bodies, while a consideration of the mode of formation of bloodclot in the living body shows it to be especially dependent upon the circulation of destructive or coagulating substances, and the contact of foreign or unhealthy matter with blood in a state of rest.

4. The vital properties of fibrin and bloodclot are next compared, and particular stress is laid upon the facts that fibrin is very stable, and resists the processes of organization and absorption, while bloodclot is very unstable, and may be readily absorbed or organized; the conditions determining these changes are referred to.

5. From these premises it is deduced that Esmarch's Bandage, so applied as to stop all circulation, does not cause a deposit of fibrin, but may cause a coagulation of the blood *en masse*.

6. The fact that this coagulum may be absorbed, broken down, or organized, the conditions leading to these changes, and their results, are then stated.

7. From these considerations certain deductions are drawn as to the cases of aneurism in which this method of treatment is likely to give the best results, and to those in which it is likely to fail. The value of preparatory treatment is insisted upon.

The pathological and clinical evidence bearing upon and supporting these views was detailed by Mr. Gould.

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Treatment of Injuries of Bloodvessels in the Field.

Dr. F. ESMARCH, Professor of Surgery in the University of Kiel, read an elaborate paper on this subject at the London Congress, from which the following is an abstract:—

1. The indications in the treatment of injuries of the larger arterial trunks, and of traumatic hemorrhage, have been considerably simplified by the introduction of "antiseptics," and of Esmarch's bandage.

2. The practice, formerly in use, of ligaturing arteries above the wound is uncertain, and ought, therefore, to be entirely discarded.

3. The application of styptics is equally objectionable, not only because of their uncertain action, but because they foul a wound, and interfere with its healing.

4. In all cases of hemorrhage, threatening life, the wounded vessel must, if possible, be exposed at the seat of injury, and ligatured above and below this point, either with catgut or antiseptised silk.

5. This operation must be carried out under the most rigid antiseptic precau-

tions; if on the extremities, an Esmarch's bandage must be applied. As it is necessary in all such cases to disinfect the wound, even to its innermost recesses, the disinfection and the operation can be done at the same time.

6. The most effectual method to render such operations easy, rapid, and thorough, is to make a free incision parallel with the axis of the limb. When life is at stake, it matters little whether such an incision is one inch or one foot in length, provided that the hemorrhage is arrested, and that the wound is kept sweet; the large wound heals just as well as the small one.

7. After freely incising the skin, the operator inserts his left index finger deep into the wound, and, with a button-pointed bistoury, opens up, just as freely, the deeper layers of connective tissue, fasciæ, and muscles, while an assistant now separates the parts with retractors.

8. The blood-clot, which is generally found to fill the wound, and to have infiltrated the surrounding cellular tissue, is now rapidly turned out, either with the fingers, or sponges, or raspatories, partly because it hides everything, and partly to avoid subsequent decomposition. It is only under these circumstances that any operation can be carried out with anything like exactitude.

9. As soon as this is done, the operator feels with his finger for the vascular and nerve trunks, and endeavours, with the aid of a clean sponge, to learn the exact nature of the injury.

10. When the large veins are empty and collapsed, it is sometimes difficult to distinguish them from strands of connective tissue. On this account it is advisable to provide a little reserve of blood, which may be done in this manner: For the arm, a cord might be fastened round the wrist below the wound, before the elastic (Esmarch) bandage was applied; then, on loosening this and raising the arm, the blood shut up in the hand would, if the vein was injured, flow into the wound, and would so make it manifest.

11. As soon as the injured spot of the artery or vein has been laid bare, so that its full extent can be clearly seen, the vessel must be isolated and then securely ligatured, either with catgut or carbolized silk, above and below the injury. If the continuity of the vessel has not already been destroyed by the injury, the vessel must be cut between the two ligatures. The operator should convince himself that no lateral or deep branches are given off to the injured part of the trunk. Should any small branches be found they ought to be carefully isolated, ligatured, and then separated from the parent trunk.

12. The Esmarch bandage should now be removed, and all bleeding vessels carefully tied, the limbs being raised, as after amputations.

13. Should any nerve trunks or tendons have been divided, their extremities must be sought for and sewn together either with fine catgut or carbolized silk.

14. Any foreign bodies (bullets, bits of bone, or fragments of clothes) which may be found should be removed.

15. The whole wound must now be thoroughly disinfected, either by irrigation, or rubbing in chloride of zinc, or strong carbolic solution, taking care that the fluid gets into every little recess.

16. After counter openings have been made in suitable places, and drainage tubes put in, the wound must be closed with antiseptic sutures, and finally the antiseptic compressive-dressing applied.

17. This operation can hardly be carried out on the battle-field, or in a first field-hospital, because it requires both time and care, and because the necessary antiseptic precautions are only to be had in a thoroughly well-organized lazaretto (hospital).

18. The elastic bandage can alone be recommended for the provisional arrest of hemorrhage on the battle-field.

19. The use of styptics is very objectionable ; all such remedies ought therefore to be banished from the surgeon's field-case.

20. The application of tourniquets, formerly so much in vogue, is likewise to be deprecated as uncertain and dangerous, not only because their application requires precise anatomical knowledge, but, and chiefly because, however accurately the pad may be adjusted, it is almost sure to slip aside during transport ; the binder then interferes not only with arterial but also with the venous circulation. As a necessary consequence either the hemorrhage recurs, or, if an external wound is closed, dangerous blood infiltration of the limb takes place.

21. An effectual and permanent compression of the vessels can be secured by means of an elastic tube, applied, while extended, two or three times round the limb. The soft structures are in this way compressed on all sides, and the circulation is entirely arrested.

22. As this compression is efficient to whichever part of the limb it is applied, no anatomical knowledge is necessary. It is in no way interfered with by transport, and it cannot slip if the extremities of the tube are carefully fastened.

23. On this account all tourniquets should be removed from the armamentaria of field hospitals, and be replaced by elastic tubes.

24. Every wounded man, on whom hemorrhage has been provisionally arrested by an elastic tube, ought of course to be removed as rapidly as possible to a hospital, in order that the compression may be removed, and the ligature of the wounded vessel immediately undertaken.

25. It is very advantageous, before putting on the elastic tube, to apply a bandage to the limb while in a raised position. If the bone is fractured, a fixative bandage of some kind ought to be applied for transport.

OPHTHALMOLOGY AND OTOTOLOGY.

Operations to be Employed in the Various Forms of Glaucoma.

Dr. DE WECKER, of Paris, read a paper on this subject at the London Congress, of which the following is an abstract :—

The most enthusiastic supporters of iridectomy in glaucoma must admit that there are cases in which this operation is ineffective, or even injurious. This admission, made even by Von Graefe himself, justifies the zeal with which new methods of operative treatment have been sought after, aided by the use of myotics.

Sclerotomy, which has now definitely established for itself a position in eye surgery, has filled up the gap left by the insufficiency of the iridectomy operation.

It is important to every observer to know what part iridectomy and sclerotomy play in the cure of glaucoma, in order to give in each case the greatest possible chance of permanent cure.

Sclerotomy will be eagerly resorted to in those cases in which iridectomy is known to be dangerous—viz., in glaucoma hæmorrhagicum, or in glaucoma congenitale, or glaucoma infantile, otherwise known as buphthalmic hydrophthalmia. Also where iridectomy is unreliable—that is to say, according to Von Graefe's own admission, in simple chronic glaucoma, with the absence of any inflammatory symptoms. Also in those cases where the visual field has contracted nearly to the point of fixation, it is unsafe to remove any iris. And prolonged experience satisfies the author still more that the scleral incision alone is the best, most complete, and safest in simple chronic glaucoma.

Shall we, then, say that all glaucomas, not amenable to iridectomy, are curable

by sclerotomy? Unfortunately, no; for exceptional cases occur in which repeated sclerotomies, as well as subsequent iridectomy, are ineffective.

Experience has taught us that a glaucoma simplex, which has resisted sclerotomy, is not to be cured by an iridectomy. We get the most striking results from iridectomy in acute glaucoma; and we can go so far as to say that the more acute the glaucoma, the more successful the operation is likely to be.

Although in acute glaucoma we obtain as good results with sclerotomy, the difficulty in its execution, and the absence of any superiority in its remedial effects, are reasons which keep us from preferring it to an operation, which, even when moderately executed, still yields excellent results.

An operation requiring a very delicate and exact procedure will hardly manage to supplant another more easy, and requiring less rigorously-exact execution, if the superiority of the first is limited to some optical and cosmetical advantages.

Another reason rendering sclerotomy less applicable is, that it is indispensable for its success that there should be a perfect contraction of the pupil under myotics, which forms the only guarantee against entanglement of the iris in the wound.

This security is afforded in all cases which myotics have transformed into simple chronic glaucoma, as well as in all those which have from their outset presented this character. Sclerotomy offers, in these all the advantages afforded by iridectomy in the acute and irritative form.

An excellent indication, for choice between the two operations, consists in the more or less complete action of myotics.

Thus sclerotomy is indicated:—

1. In (all forms of) hemorrhagic glaucoma (and in those suspected of belonging to this category).
2. In (all cases of) glaucoma congenitale (buphthalmia).
3. In (all cases of) chronic simple glaucoma.
4. Whenever after an iridectomy the vision has deteriorated, or when the good result of this operation begins after a period to diminish.
5. In combating the prodromata of glaucoma.
6. In all cases of glaucoma absolutum, with complete atrophy of iris, and attacks of pain.

Nature of Sympathetic Ophthalmitis and the Mode of its Transmission.

Prof. H. SNELLEN, of Utrecht, presented a paper on this subject, at the London Congress, in which he maintained that: 1. The explanation of sympathetic ophthalmitis as a reflex action of the ciliary nerves is insufficient.

2. As a clue to further research, the hypothesis recommends itself that sympathetic ophthalmitis is to be regarded as a metastatic specific inflammation, in which special parasitical inflammatory elements are conveyed over to the choroid of the sympathizing eye through the dilated lymph-paths.

Mr. W. A. BRAILEY, of London, maintained that the uveitis, which is so strikingly manifest in the well-marked and severe cases of this disease, presents certain definite pathological characters by which it can be distinguished histologically from other forms of inflammation.

These characters, though they differ a little at different parts of the uveal tract, are nearly always recognizable in both eyes.

Though in the sympathizing eye the disease often, as is well known, begins as an iritis serosa, with accompanying keratitis punctata, yet here also the peculiar characters of sympathetic ophthalmitis usually become visible at a later stage.

The disease is not transmitted from one eye to the other, by the passage of structural change along either optic or ciliary nerves.

Relation between Optic Neuritis and Intracranial Disease.

Prof. TH. LEBER, of Göttingen, in some remarks which he made at the London Congress, stated that in his opinion optic neuritis in cerebral diseases is a true inflammation, and is not essentially different from other forms of papillo-retinitis, either in the character of the vascular congestion, or in the nature of the histological changes. It is, on the other hand, very different from the hyperæmia caused by venous stasis and the lesions which depend on it. This inflammation is not caused by stasis in the retinal veins from compression of the cavernous sinus, due to diminished intra-cranial space. It is not the result of irritation of vasomotor nerves, caused by the cerebral affection. It is the optic nerve which is the path of communication between the affection of the brain and that of the eye. An essential part in this transmission is taken by the effusion of a serous fluid into the sheath of the nerve extruded from the cranium by the increased intracranial pressure. This fluid does not act by simple mechanical pressure, since its quantity is sometimes small; probably it possesses phlogogenic properties.

Intracranial tumours act as a sort of foreign bodies provoking inflammatory congestions, and hypersecretion of fluid (internal hydrocephalus). The same effusions are found in meningitis when it is followed by papillitis. The origin of papillo-retinitis in cerebral diseases may, then, be explained by assuming that the intracranial inflammation produces serous effusion, which passes into the optic sheath, and exerts an irritating action on the papilla and neighbouring parts of the eye.

The Pathogenesis and Etiology of Nystagmus of Miners.

Dr. NIEDEN, of Bochum, at the London Congress, read a paper which had for its object to determine:—

1. The percentage of the affection.
2. Its cause.

7054 individuals were examined at the pit's mouth, while going to or returning from their work. Among these 296 (4.2 per cent.) cases occurred. Of 1808 who were examined on their way to work, there were 62 (3.4 per cent.), while, of 1746 returning, the number was 52 (3 per cent.). Out of 3017 miners who came under treatment for various forms of eye disease, nystagmus occurred in 172 = 5.6 per cent. Out of a total number of 29,640 persons of all sorts treated for eye affections, the percentage was .55.

Nystagmus occurs only in certain pits, that is to say, in those where the illumination is defective, and especially where the safety lamp is in use. Out of 117 cases encountered within the last two years, 107 (91 per cent.) had worked with this lamp. But where the naked light was in use the cases occurred only sporadically. It is important to notice the frequency of concurrent eye affections, which are met with in 38 per cent. of the cases. Also, of general disorders, which are found in about 45 per cent.

Nystagmus of miners occurs in the mining districts of Westphalia as a general nervous disease in from 4.2 to 8 per cent. of those employed. It consists, not in a muscular spasm, but in a defective innervation, like the tremor of old persons. It is occasionally brought on by working with insufficient light, also by general constitutional conditions. A probable means of preventing this disease would be to double or treble the illuminating power of the lamps in use.

A New Operation for the Cure of Ptoſis.

Dr. HERMANN PAGENSTECHER, of Wiesbaden, in calling the attention of the London Congress to the operation which he has devised, stated that all the ope-

rations at present employed for the cure of ptosis are unsatisfactory, sometimes producing too great, and sometimes too little result.

It is necessary, in order to obtain perfect movement of the upper lid, to continue the action of the musculus frontalis to this lid itself. This can be achieved by making a scar do the work of a tendon to the frontalis, by which means the upper lid is compelled to follow the movements of that muscle. The simplest way of doing this is to introduce a thick suture above the superciliary ridge, bringing it out at the margin of the lid, and to tie the ends together, leaving it gradually to cut its way out. It is possible also to apply the suture subcutaneously, thus avoiding all disfigurement by scars.

The cicatrix thus formed, acts as a tendon to the frontalis, raises the upper lid, and does not prevent its closure.

Many cases have already been operated on by the author with the happiest results.

Action of Foreign Bodies introduced into the Interior of the Eyeball.

Prof. TH. LEBER, of Göttingen, in a paper on this subject, read at the London Congress, maintained that: 1. Foreign bodies which are clean, and which exert no chemical action, do not cause any inflammation in the interior of the eye.

2. Clean fragments of oxidizable metals—*e. g.*, iron, steel, copper—do not cause purulent inflammation, but many other phenomena which seriously compromise the functions of the eye, especially contraction of the vitreous and detachment and atrophy of the retina.

3. The entrance of metallic fragments into the interior of the human eye is usually followed by purulent inflammation, just as in experiments made without antiseptic precautions upon animals. This inflammation is always due to the action of germs which have entered through the wound.

4. Certain chemical substances—*e. g.*, arsenic, binoxide of mercury, croton oil, etc.—when introduced into the interior of the eye are capable of setting up purulent inflammation, which is quite independent of the action of germs.

5. The extract of septic liquids, in which the germs have been killed by boiling, set up a transient inflammation when injected into the anterior chamber or into the corneal tissue. These experiments favour the hypothesis that the phlogogenic action of the germs depends on the production of chemical substances which act on the vessels.

6. Cysticerci may also set up purulent inflammation in the eyeball, due perhaps to an irritating secretion from these entozoa.

A New Method of Examining and Numerically Expressing the Colour Perception.

Dr. OLE BULL, of Christiania, at the London Congress, explained his method, which is based on producing the four principal colours of an equal intensity and shade.

From among the different hues of these colours the author has, for blue, chosen that which mixed with uncoloured light appears blue or colourless. A yellow, complementary to this blue, and of a like shade and intensity, is then produced. A red and a green have been chosen, which at the periphery of the retina appear either of their real colours, or colourless. Such a hue of this red and green is then chosen as to give, when mixed in equal parts, an indifferent gray, of the same shade as that given by the mixture of blue and yellow above referred to.

From these four colours, six fainter tints are derived by mixing up on Maxwell's disk, the single colour with uncoloured (gray) light of the same shade as

that given by each pair of the two complementary colours mixed together. The relative intensity of these tints can be expressed by indicating the number of the degrees of the coloured sector, namely, 40° , 60° , 80° , 120° , 160° , 240° . These tints are fixed by imitating them with pigment, and then—together with the four principal colours—painted on a black plate in squares.

A patient's colour-sense may be examined by this plate simply by pointing out any coloured or uncoloured square, and then asking him to indicate that square which appears most like it. If he is colour-blind, he will make mistakes. If his colour-sense is diminished by disease, both the kind and the degree of the defect may be detected. As the healthy eye at a distance of one metre from the plate can just discern the faintest tint— 40° —a colour-sense corresponding to this is taken as normal. If, *e. g.*, a patient can discern red only up to 80° , and green to 120° , he is beginning to turn green-red-blind, and his perception of these colours may be expressed for the red by $\frac{1}{2}80^{\circ}$ and for the green by $\frac{1}{2}120^{\circ}$.

MIDWIFERY AND GYNÆCOLOGY.

Antisepsis in Midwifery.

Prof. SPIEGELBERG, of Breslau, in a communication forwarded to the London Congress, said that the great reform in surgery brought about by the antiseptic treatment could not fail to have a deep influence upon the treatment of the complications in childbed, as it was well known long ago that the latter are the same which arise from wounds. If, however, scrupulous cleanliness, which had been advocated long ago, favoured a normal course of the puerperium, the practical gain was not very great.

The idea that the puerperal wounds are infected, and the inflammation of the genital organs are initiated by germs coming from outside, became more in vogue, and the idea that phlogogenous matter might be produced spontaneously within the genital tract, was almost abandoned. The consequence of this idea was recommending the most scrupulous cleanliness of hands and instruments; forbidding practitioners engaged in midwifery to attend other patients; forbidding students engaged in dissecting to attend midwifery cases; forbidding nurses attending cases of puerperal fever to attend normal cases at the same time.

The experience that all these measures reduced the number of bad cases only little originated the idea of secondary antisepsis. Intra-uterine irrigations and drainage came in use, but without much avail; the opinion took root that there was no identity between wound and childbed complications—that there existed an essential puerperal process.

These failures can be made comprehensible by laying clearly open the development of infection; and here, too, is it necessary to refer to the history of the antiseptic surgery.

The theory and practice of Lister's system is founded upon the view now sufficiently justified by experience, that infection is brought about by the action of germs which float about in the surroundings of the patient, and which fall on the recently-made wound. It is, therefore, absolutely necessary to clean the surroundings from the germs; if that is not practicable, to destroy the efficiency of these germs while the wound is open, and by keeping subsequently the wound closed. The application of these rules upon the puerperium means: The strictest cleanliness and antisepsis during the time in which the puerperal wound arises—that is, during birth—as well from the part of the persons attending the mother as from the mother herself. Prevention of air entering the genital tract; and as that is

not wholly unavoidable, disinfection by frequent irrigation with antiseptics during birth. After birth, care must be taken to secure perfect rest for the genital tract to encourage involution, avoiding every intravaginal or intrauterine manipulation which is not absolutely necessary; if so, it must be done under strictly antiseptic precautions.

Secondary antiseptics—that is, antiseptics after the infection has taken place—is of not much avail. It is only directly useful in processes of decomposition, so long as they have not passed the surfaces of the tract, and not yet attacked the parenchyma of the organs. But if that is not the case antiseptics is only a palliativum, but no trustworthy remedy, since drainage and irrigation do not hit the deep seats of the disease, and do not remove or destroy the entered germs, not to speak of the inconveniences of the practical application of the secondary antiseptics.

Prevention and Treatment of Post-partum Hemorrhage.

Dr. THOMAS MORE MADDEN, of Dublin, at the London Congress, presented a paper on this subject, of which the following is an abstract:—

Death from flooding after delivery should be considered as a generally preventible accident, and in the more perfect midwifery practice of the future will doubtless be entirely unknown. In their zeal to contribute to their complete deliverance from what is still, with too much reason, an ever-present terror to obstetric practitioners, some eminent modern authorities, who advocate the employment of perchloride of iron and other remedies on the least appearance of post-partum hemorrhage, appear to have an exaggerated idea of the frequency of severe flooding, and to forget that some slight loss of blood is a natural termination of labour. When due care is taken in the way of preventive treatment fatal hemorrhage is a comparatively rare accident. Thus, in a practice of upwards of twenty years in various countries, tropical as well as European, and during his connection with the largest lying-in hospital in Great Britain, Dr. More Madden has only seen one case of death from hemorrhage after child-birth.

We may almost always obviate, although we cannot yet always arrest flooding. The majority of cases of post-partum hemorrhage are met with in women who have previously borne children, and the probability of its occurrence is in proportion to the number of the patient's previous confinements. In the Dublin Lying-in Hospital, of 89 cases of this kind, in 65 the patients were multiparæ. In such cases when we have any reason to anticipate hemorrhage, the membrane should be ruptured as early as possible during labour, so as to allow the uterus to contract gradually and firmly; and a dose of ergotine, or a drachm of the fluid extract of ergot, should be injected hypodermically before the head comes to press on the perineum. As a prophylactic of hemorrhage, the efficacy of a course of any astringent preparation of iron given during the last months of pregnancy is unquestionable.

Hemorrhage after delivery, from laceration of the cervix uteri, is more common than was formerly the case. This arises from the abuse of the long curved forceps which is now too often needlessly resorted to before the full dilatation of the os. Hence, Dr. More Madden thinks that in this way the abuse of the long forceps does as much harm as the use of the short, straight forceps does good in judicious hands.

Reviewing his experience of the various modern methods of arresting flooding, the writer says that the injection of hot water into the uterus in such cases is most uncertain in its hæmostatic action, and is only useful in cases of extreme depression of the vital powers from excessive hemorrhage, and after the failure of other remedies. Neither is the injection of cold or iced water to be depended

on. The injection of a strong solution of perchloride of iron, although generally effectual as a styptic, is so hazardous, from the risk of its causing metro-peritonitis, that the writer now seldom resorts to it. But he strongly recommends what he regards as a most effective and comparatively safe method of arresting post-partum hemorrhage—namely, the introduction of a sponge soaked in a solution of the perchloride of iron which is to be passed into the uterus (grasped in the accoucheur's hand), and retained there until a firm contraction is produced, by which the sponge and the hand in which it is held are expelled together from the uterine cavity, and the flooding is stopped. At the same time he lays great stress on external manual pressure over the uterus in all cases until contraction is produced; and he points out the possible danger of thus introducing the hand into the uterus, unless when rendered necessary by severe hemorrhage. With regard to the treatment of collapse from hemorrhage after delivery, he regards transfusion as now practised, as almost useless in the great majority of cases of the emergency for which it is recommended. Instead of transfusion, he advocates the hypodermic injection of large doses of sulphuric ether, as suggested by Von Hecker; and he refers to the history of some remarkable instances of the good effects of this remedy in apparently hopeless cases of collapse from post-partum hemorrhage.

— *Total Extirpation of the Uterus.*

Dr. WILLIAM FREUND, of Strassburg, opened a discussion at the London Congress on this operation with which his name has been intimately connected. The following is an abstract of his remarks:—

My experiences of three years, which have elapsed since my first publication on total extirpation of the uterus, and the works by others on the same subject which have appeared within this interval, have rendered my judgment clear as regards the most weighty points in the matter.

There can be no question that, in carcinomatous disease of the uterus, which extends over a considerable portion of this organ, total extirpation is the operation indicated. A long time ago surgeons repeatedly resorted to this operation, and tried both the methods which are being undertaken at the present day, namely, the operation through the vagina, and that through incision of the abdominal walls. The results of these attempts were so unfortunate, that for a long time no further were made.

When I had put my method to the test with a favourable result in the first case, and when the first cases operated upon by Dr. Martini at Breslau, Dr. Kocks at Bonn, Prof. Olshausen at Halle, Prof. Schröder at Berlin, Dr. Veit at Berlin, Prof. Spiegelberg at Breslau, Dr. Kuhn at St. Gallen, had likewise proved successful, the hope, and even a somewhat excessive confidence, that I had at last safely solved this great problem of surgery, was intelligible and justified. But when unfavourable results were frightfully multiplied, when also the mournful fact became clear, that recurrences did occur after successful operations, then discouragement and oppositions appeared on many sides, and this feeling now limits almost as much as its opposite had previously raised expectations to excess.

In fact, considering the results, which, as regards recovery from the operation, were more unfavourable, as regards radical cure were not more favourable than those of amputation of the diseased portio vaginalis, and of supra-vaginal amputation of the diseased corpus uteri, we should be no longer justified in undertaking total extirpation, if this operation, which is at all events justly indicated, could not be carried out with greater safety to life than hitherto. This greater safety, according to most recent experience, is secured by the vaginal total ex-

tirpation, carried out according to the principles of Czerny, Billroth, Schröder, Martin, and the abdominal total extirpation modified, according to the directions of Bardenheuer, Breisky, Rydygier, Kolaczek, M. B. Freund. The leaving open and drainage of the peritoneal cavity, the simple ligaturing of the vessels of the severed broad ligaments step by step, make the operation shorter, less laborious, and hasten the healing. I have convinced myself by experiment upon the dead body that, after separation of the cervix uteri from the vault of the vagina, it is easy to draw up the uterus through the abdominal wound above the symphysis.

Rydygier and I have carried out upon the living subject this mode of operating, first recommended by Breisky, and I can strongly praise it. If we draw the uterus up by the tenaculum-forceps invented by me, we at once render the uterus comparatively bloodless. The severing of the cervix all round from the vagina, I have carried out without chloroforming the patient immediately before the actual operation.

The results of the vaginal total extirpation as regards recovery from the operation appear to be very good, and the same way, Kolaczek is able to confirm that in the method of *abdominal* total extirpation as practised by him and Martini, a fatal result is exceptional. So would have been attained the object in this operation, which I have stated as the one to be sought for—that the operation may be undertaken as a not very dangerous one in the early stages of carcinoma and sarcoma, in which it gives a promise of radical cure. Whether the vaginal or the abdominal extirpation is to be performed, must be decided according to the individual case. If the uterus is very large, and the vagina very narrow, the abdominal total extirpation must always be undertaken. With a small uterus and capacious vagina, vaginal operation is to be preferred. But we must always keep before our eyes a point which at the same time Kolaczek notices, namely, that the abdominal operation has a great advantage, in facilitating and insuring the carrying out of the separation of the uterus through sound tissue.¹

My original method of total extirpation is to be considered as a stage in the development of this operation, which stage was then in perfect accordance with demands put forth by Hegar-Kaltenbach, namely, the procuring against bleeding and against leaving open the peritoneal cavity. Indeed, this stage now is over-come, since a more advanced knowledge has shown that the danger of bleeding is not so great, and the danger of the peritoneal aperture no longer to be considered, nay, rather that the keeping open of the peritoneal wound is highly desirable. I regard it as a great advantage of our time that such advances in knowledge and art are so rapidly accomplished, and I am rejoiced to have given an impulse to this advance.

Oöphorectomy.

Dr. ROBERT BATTEY, of Rome, Georgia, made the following remarks at the London Congress, concerning this operation with which his name is usually associated. He said:—

This operation is peculiar, in that it has for its primary object, not the removal from the body of a diseased organ, but the abrogation of a physiological function.

¹ *Note of the 7th of July.*—The 5th of July I have extirpated the uterus by *abdominal* method, in spite of the uterus having been of small size and the vagina sufficiently large, in order to remove several much enlarged intra-abdominal (iliac) glands, presumed to be carcinomatous (as by microscopic inquiry after removing, was stated). Extirpation of these glands has not been yet—as far as I know—undertaken and proved not to be at all difficult. The further course of this case shall be made known in time.

Whilst it is undoubtedly true that the ovaries extirpated, in the majority of instances, are structurally diseased, the end aimed at is not the removal of diseased ovaries, but it is the production of the change of life by art.

In America the operation was introduced under the name Normal-Ovariectomy—a name badly chosen and soon abandoned. Spaying was offered and rejected, because it is not the equivalent of spaying in the lower animals. The term is inappropriate, repulsive to refined taste, and especially offensive to the subjects who have earnestly protested against it. Oöphorectomy has been rejected on the ground that it was introduced by Peaslee as a synonym of ovariectomy, and is so accepted in America. Its use suggests merely the removal of an ovary, and not the artificial menopause. Should the suggestion of Simpson, to accomplish the change of life by simple ligature of the ovaries, without their removal, be realized in practice, the term Oöphorectomy would be manifestly inappropriate, whilst the essential feature of the operation would be in no wise altered. To get over these difficulties, Marion Sims has proposed Battey's operation, and argues that the convenience and suggestiveness of the term should overcome the objections to naming diseases and operations after individuals. In Germany the operation is known as castration of women, a term as inappropriate and as objectionable to American sense of propriety as is spaying.

History.—This operation appears first to have been contemplated as early as 1823 by James Blundell, of London, as has been pointed out by Aveling. Blundell, however, does not seem to have regarded his own suggestion as likely to lead to any practical results. In October, 1865, Battey conceived the idea of producing, by double ovariectomy, the artificial menopause for the effectual remedy of otherwise incurable diseases.

Upon the 27th July, 1872, Hegar did the operation, at Freiburg, with fatal results, but does not appear either to have published it to the world, or essayed it again, until four years afterwards. August 1st, 1872—Lawson Tait practised it at Birmingham, with fatal result, but made no publication of his case.

August 17th, 1872—Battey operated at Rome, Georgia, with success. He published the case in the following month, and in April, 1873, he discussed and defended the operation before the Medical Association of Georgia. He operated again in March, 1874, and a third time in June, 1874, with like success. December 18th, 1872—Gilmore, at Mobile, Alabama, followed Battey in a successful case.

Is there a proper field for the operation? During the civil war in America, Mrs. H., of Mississippi, was confined of a first child. Extensive sloughing of the whole genital tract ensued, ending in occlusion of vagina and uterus. The restoration of the outlet proved impossible, and her sufferings became "intolerable and indescribable." She was entirely cured by the removal of her ovaries. A similar case, in the hands of Dr. Grange Simons, of South Carolina, died from the consequences of unrelieved menstrual molimen. Were these proper cases for the operation? To deny the conclusion is but to assert the absurd proposition, that agonizing suffering, ending in miserable death, is to be preferred to health and continued, enjoyable life. However closely we may choose to draw the lines, there certainly is a proper field for the operation.

Indications.—It was foreseen from the very inception of the operation that its sphere of applicability, in exceptional cases, must be as widely extended as the very diverse effects of the vascular and nervous perturbations which follow upon perversions of the function of ovulation. Hence, in order to cover the ground fully, and give a key for the selection of suitable cases, it was proposed: "Ovariectomy to determine the change of life; and the change of life for any grave disease which is incurable without it and which is curable with it." Perhaps no

safer rule can be laid down to-day than is embodied in the three questions: Is this a grave case? Is it incurable by any of the resources of the art short of the change of life? Is it curable by the change of life? If all three of these questions can be answered affirmatively, the case is a proper one; but, if not, the operation is not to be justified.

That the operation, in its very essence, opens a door for widespread abuse, was foreseen from the first, and has been recognized and pointed out by judicious minds everywhere. Much as we must deprecate the still-existing prejudice which would offer a lifetime of untold misery, and even life itself as a holocaust upon the altar of some supposed sanctity in female sexual organs, we cannot forget that the medical profession is to a degree the guardian of public morals, and is bound to maintain decency and self-respect. This operation, therefore, cannot in any case be received as an alternative for other means of cure, but must be held, as it was originally offered, for *dernier ressort*. It has been attempted to classify the diseased conditions, and point out with precision the circumstances in which the operation is to be done. However carefully such classification may be made, it is to be questioned whether a proceeding so open to abuse should go out to the world as a recognized remedy for amenorrhœa, dysmenorrhœa, menorrhagia, or any other diseased state.

Operation.—But two points call for special attention. 1st. Mode of access. In America the vaginal and abdominal methods are both in use, but in Europe the abdominal alone finds favour. For the vaginal it is claimed (*a*) the mortality is less; (*b*) it favours perfect drainage; (*c*) air is admitted to the peritoneal cavity in but slight degree; (*d*) the intestinal mass is but little exposed to mechanical irritation. To it may be objected the rather frequent occurrence of formidable adhesions, and the difficulty and even impossibility of dealing with them properly, and effecting complete removal of the ovaries. So excellent, however, have been the results, in well selected cases, this method should not be wholly abandoned, but practised only when the accessibility of the ovaries and absence of all adhesions are well assured. 2d. Dealing with the pedicle. The practice of employing the ligature, simple or carbolized, with ends cut short, is well nigh universal. Battey has in thirteen instances severed the pedicle with the *écraseur* alone; in no case has any troublesome hemorrhage occurred.

Proximate Results.—1st. Mortality. In the cases collected the death-rate has been 22 per cent. for the complete operations, and 9½ per cent. for the incomplete. 2d. Menopause. It is a well-known fact that in exceptional cases after double ovariectomy the menses have reappeared, and this not occasional only but regular in occurrence and normal in characteristics. In none of these cases, however, has it been shown that a third, or supplemental, ovary, did not exist, or that fragments of ovarian stroma were not left behind. In Battey's cases when even small fragments of the ovaries were left, the menses invariably continued, and in one instance a child even was subsequently born.

Ultimate Results.—1st. Aphrodisia. Patients who have been subjected to the operation have not in any case complained of the loss of this power, but on the contrary they have in a number of instances borne testimony to their full competency. 2d. Female graces. These have not been impaired in any case, but a positive gain has often been noted. 3d. General health. As the operation is proposed only as a *dernier ressort* and in cases of a desperate character, whatever of benefit is to be secured is to be accounted so much actual gain. It is hypercritical to object that some of the cases are not benefited and others are not wholly cured. Comparing the cases tabulated as complete operations, we find—

	Number.	Per cent.
Cured	68	75
Greatly benefited	15	17
Not benefited	7	8

Of the complete operations—

Cured	3	18
Greatly benefited	7	41
Not benefited	7	41

In several instances where the results were unsatisfactory for some months (or even a year or more) the patients were subsequently much improved, and a few were even completely cured. It is premature to set down any case as a failure until ample time has been allowed for the cyclical change to have become complete in its entirety.

Dr. THOMAS SAVAGE, of Birmingham, gave a record of thirty consecutive operations performed during the last two years, for various conditions, which are detailed—ten being for long-standing and painful prolapse of the ovary, and four for myoma. His experience up to the present time leads him to consider that for the two above-named conditions there is a large field of successful and beneficial practice open to oöphorectomy in properly selected cases; but that in the cases of so-called ovarian dysmenorrhœa there is considerable difficulty in coming to a conclusion as to the cases where it will be likely to be suitable; for it seems necessary that a considerable period must elapse after the operation, in these cases, before the benefits hoped for are apparent. Dr. Savage thinks the enlargement of the prolapsed ovary is often due to an inversion of the organ into Douglas's space, giving rise, in the first instance, to œdema, and subsequently to areolar hyperplasia or a cystic condition. With the one exception—the inability to conceive—patients after oöphorectomy possess every attribute of womanhood. The facility and safety of the operation being now fully established, it becomes our next duty to define as far as possible the conditions for which it is applicable, also those for which it is inapplicable, so that it may not be abused.

HYGIENE.

The Experience of the United States in Recent Years with Regard to Asiatic Cholera and Yellow Fever.

Dr. JOHN S. BILLINGS, of the U. S. Army, was the author of a paper on this subject, read at the London Congress, of which the following is an abstract:—

I. As regards cholera, this experience accords in most points with the conclusions of the Conferences of Constantinople and Vienna. The quarantines of the United States have not been, and are not now, capable of preventing the importation of cholera. In the United States there is special danger of such importation through the personal baggage of emigrants.

When the disease has been introduced, more can be done in stamping it out, and in the way of personal prophylaxis, than in other pestilential diseases. The systematic disinfection of excreta, clothing, and persons, and the securing pure food and drink, are the means to this end.

II. As regards yellow fever, the epidemics of 1878 and '79 have produced considerable change in the opinions of American physicians. The majority believe that it is a specific disease—not connected with marsh malaria—due to a specific living cause, and not indigenous to, or endemic in, the United States, in which country it is always due to importation.

III. This importation might, to a great extent, but not entirely, be prevented by a proper system of quarantine, without causing undue obstruction to travel or traffic. The word quarantine includes what the Vienna Conference terms systems of medical inspection, and does not necessarily imply detention either of ships, persons, or cargo, beyond the time needed for cleansing and disinfection.

IV. Measures which, without entirely preventing, will delay the importation of yellow fever, have a much greater relative importance than in other diseases, and for this reason inland quarantines are of much more value in this disease than in cholera.

V. The experience of 1879 is favourable to attempts to stamp out yellow fever by systematic cleansing and disinfection of the infected localities, and also by measures of depopulation and the formation of camps.

VI. Much of the practical difficulty in dealing efficiently with yellow fever being connected with diagnosis, attention is called to a recent attempt to formulate a diagnosis of this disease for sanitary purposes.

VII. From the practical as well as the scientific point of view, the great desideratum at present as regards both cholera and yellow fever, is a test for the presence of their causes, other than the production of the disease in man.

VIII. Yellow fever cities are filthy cities, and yellow-fever ships are usually foul ships. But we know of no city in the yellow-fever region that is clean enough to make this rule of much importance as regards them, and it would be very unsafe to act on the supposition that a clean ship cannot become infected.

IX. The greatest difficulties in the way of preventing the introduction of cholera and yellow fever into the United States, are due to the want of reliable information as to the sanitary condition of foreign ports, and of vessels sailing therefrom. To overcome these difficulties, co-operation between the great commercial nations of the earth is desirable.

X. Some account is given of the effort of the National Board of Health to secure this co-operation through the International Sanitary Conference of Washington, and of the results of this Conference. The conclusions of the Conference are not satisfactory, and will give no practical result. The proper basis for an international agreement on the subject is the following:—

1. Each government should secure prompt and reliable information as to the existence of cholera, yellow fever, and plague, within its boundaries, and especially in its seaports.

2. Each government should communicate this information to the other parties to the agreement, and especially to their consuls, or consular agents, at the seaports. In case of the occurrence of either of the above-named diseases, the communication should be made with the least possible delay—by telegraph, if practicable.

3. When bills of health are required by any one of the contracting governments, such bills should be signed by its own agents at the port of departure, and these agents should have the right to make such inspection of the ships as is necessary to enable them to certify to the bill of health.

4. The agents charged with the duty of signing the bill of health should also have the privilege, in case either cholera, yellow fever, or plague exists at the port of departure, of making use of the telegraph to notify their respective governments of the departure of ships from such infected ports.

5. The bill of health should be of the form approved by the Washington International Sanitary Conference—it should be neither a clean bill, nor a foul bill, but a certificate in detail as to the sanitary condition of the port, and of the ship.

AMERICAN INTELLIGENCE.

OFFICIAL.

RECORD OF THE POST-MORTEM EXAMINATION OF THE BODY OF PRESIDENT J. A. GARFIELD, MADE SEPTEMBER 20, 1881, COMMENCING AT 4.30 P.M., EIGHTEEN HOURS AFTER DEATH, AT FRANCKLYN COTTAGE, ELBERON, NEW JERSEY.

PRESENT and assisting, Dr. D. W. Bliss; Surgeon-General J. K. Barnes, U. S. Army; Surgeon J. J. Woodward, U. S. Army; Dr. Robert Reyburn; Dr. Frank H. Hamilton; Dr. D. Hayes Agnew; Dr. Andrew H. Smith, of Elberon (and New York); and Acting-Assistant-Surgeon D. S. Lamb, of the Army Medical Museum, Washington, D. C.

Before commencing the examination, a consultation was held by these physicians, in a room adjoining that in which the body lay, and it was unanimously agreed that the dissection should be made by Dr. Lamb, and that Surgeon Woodward should record the observations made. It was further unanimously agreed that the cranium should not be opened. Surgeon Woodward then proposed that the examination should be conducted as follows :—

That the body should be viewed externally, and any morbid appearances existing recorded. That a catheter should then be passed into the wound, as was done during life to wash it out, for the purpose of assisting to find the position of the bullet. That a long incision should next be made from the superior extremity of the sternum to the pubis, and this crossed by a transverse one just below the umbilicus. That the abdominal flaps thus made should then be turned back and the abdominal viscera examined. That after the abdominal cavity was opened the position of the bullet should be ascertained, if possible, before making any further incision; and that, finally, the thoracic viscera should be examined.

This order of procedure was unanimously agreed to.

The examination was then proceeded with, and the following *external appearances* were observed :—

The body was considerably emaciated, but the face was much less wasted than the limbs. A preservative fluid had been injected by the embalmer, a few hours before, into the left femoral artery; the pipes used for the purpose were still in position. The anterior surface of the body presented no abnormal appearances, and there was no ecchymosis or other discoloration of any part of the front of the abdomen.

Just below the right ear, and a little behind it, there was an oval ulcerated opening, about half an inch in long diameter, from which some sanious pus was escaping, but no tumefaction could be observed in the parotid region.

A considerable number of purpura-like spots were scattered thickly over the left scapula, and thence forwards as far as the axilla. They ranged from one-eighth to one-fourth of an inch in diameter, were slightly

elevated and furfuraceous on the surface, and many of them were confluent in groups of two to four or more. A similar but much less abundant eruption was observed sparsely scattered over the corresponding region on the right side.

An oval excavated ulcer about an inch long, the result of a small carbuncle, was seated over the spinous process of the tenth dorsal vertebra. Over the sacrum there were four small bed-sores, the largest about half an inch in diameter. A few acne pustules and a number of irregular spots of post-mortem hypostatic congestion were scattered over the shoulders, back, and buttocks. The inferior part of the scrotum was much discoloured by hypostatic congestion. A group of hemorrhoidal tumours, rather larger than a walnut, protruded from the anus.

The depressed cicatrix of the wound made by the pistol-bullet was recognized over the tenth intercostal space, three and a half inches to the right of the vertebral spines. A deep linear incision (made in part by the operation of July 24th, and extended by that of August 8th) occupied a position closely corresponding to the upper border of the right twelfth rib. It commenced posteriorly about two inches from the vertebral spines and extended forwards a little more than three inches. At the anterior extremity of this incision there was a deep, nearly square, abraded surface about an inch across.

A well-oiled flexible catheter, fourteen inches long, was then passed into this wound, as had been done to wash it out during life. More resistance was at first encountered than had usually been the case, but after several trials the catheter entered, without any violence, to its full length. It was then left in position, and the body disposed supinely for the examination of the viscera.

The *cranium* was not opened.

A long incision was made from the superior extremity of the sternum to the pubis, followed by a transverse incision crossing the abdomen just below the umbilicus. The four flaps thus formed were turned back and the abdominal viscera exposed. The subcutaneous adipose tissue divided by the incisions was little more than one-eighth of an inch thick over the thorax, but was thicker over the abdomen, being about quarter of an inch thick along the linea alba, and as much as half an inch thick towards the outer extremity of the transverse incision.

On *inspection of the abdominal viscera, in situ*, the transverse colon was observed to lie a little above the line of the umbilicus. It was firmly adherent to the anterior edge of the liver. The greater omentum covered the intestines pretty thoroughly from the transverse colon almost to the pubis. It was still quite fat, and was very much blackened by venous congestion. On both sides its lateral margins were adherent to the abdominal parietes opposite the eleventh and twelfth ribs. On the left side the adhesions were numerous, firm, well organized, and probably old;¹ on

¹ These adhesions, and the firm ones on the right side, as well as those of the spleen, possibly date back to an attack of chronic dysentery from which the patient is said to have suffered during the civil war.

the right side there were a few similar adhesions and a number of more delicate and probably recent ones.

A mass of black, coagulated blood covered and concealed the spleen and the left margin of the greater omentum. On raising the omentum it was found that this blood-mass extended through the left lumbar and iliac regions and dipped down into the pelvis, in which there was some clotted blood and rather more than a pint of bloody fluid.¹ The blood-coagula having been turned out and collected, measured very nearly a pint. It was now evident that secondary hemorrhage had been the immediate cause of death, but the point from which the blood had escaped was not at once apparent.

The omentum was not adherent to the intestines, which were moderately distended with gas. No intestinal adhesions were found other than those between the transverse colon and the liver, already mentioned.

The abdominal cavity being now washed out as thoroughly as possible, a fruitless attempt was made to obtain some indication of the position of the bullet before making any further incision. By pushing the intestines aside, the extremity of the catheter, which had been passed into the wound, could be felt between the peritoneum and the right iliac fascia; but it had evidently doubled upon itself, and although a prolonged search was made, nothing could be seen or felt to indicate the presence of the bullet, either in that region or elsewhere.

The abdominal viscera were then carefully removed from the body, placed in suitable vessels, and examined seriatim, with the following result:—

The adhesions between the liver and the transverse colon proved to bound an *abscess-cavity* between the under surface of the liver, the transverse colon, and the transverse meso-colon, which involved the gall-bladder, and extended to about the same distance on each side of it, measuring six inches transversely and four inches from before backward. This cavity was lined by a thick pyogenic membrane, which completely replaced the capsule of that part of the under surface of the liver occupied by the abscess. It contained about two ounces of greenish-yellow fluid—a mixture of pus and biliary matter. This abscess did not involve any portion of the substance of the liver except the surface with which it was in contact, and no communication could be detected between it and any part of the wound.

Some recent peritoneal adhesions existed between the upper surface of the right lobe of the liver and the diaphragm. The *Liver* was larger than normal, weighing eighty-four ounces; its substance was firm, but of a pale yellowish colour on its surface and throughout the interior of the organ, from fatty degeneration. No evidence that it had been penetrated by the bullet could be found, nor were there any abscesses or infarctions in any part of its tissue.

¹ A large part of this fluid had probably transuded from the injecting material of the embalmer.

The *Spleen* was connected to the diaphragm by firm, probably old peritoneal adhesions. There were several rather deep congenital fissures in its margins, giving it a lobulated appearance. It was abnormally large, weighing eighteen ounces; of a very dark, lake-red colour, both on the surface and on section. Its parenchyma was soft and flabby, but contained no abscesses or infarctions.

There were some recent peritoneal adhesions between the posterior wall of the *Stomach* and the posterior abdominal parietes. With this exception no abnormalities were discovered in the stomach or *Intestines*, nor were any other evidences of general or local peritonitis found besides those already specified.

The *Right kidney* weighed six ounces, the *Left kidney* seven. Just beneath the capsule of the left kidney, at about the middle of its convex border, there was a little abscess one-third of an inch in diameter; there were three small serous cysts on the convex border of the right kidney just beneath its capsule; in other respects the tissue of both kidneys was normal in appearance and in texture.

The *urinary bladder* was empty.

Behind the right kidney, after the removal of that organ from the body, the dilated *track of the bullet* was dissected into. It was found that from the point at which it had fractured the right eleventh rib (three inches and a half to the right of the vertebral spines) the missile had gone to the left, obliquely forwards, passing through the body of the first lumbar vertebra, and lodging in the adipose connective tissue immediately below the lower border of the pancreas, about two inches and a half to the left of the spinal column, and behind the peritoneum. It had become completely encysted.

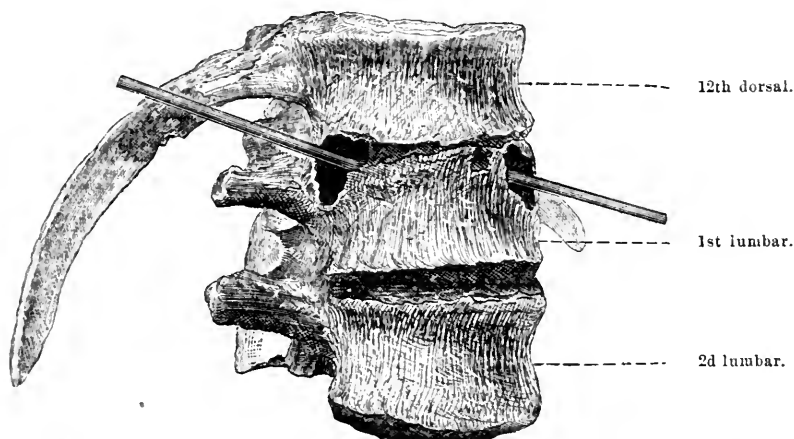
The track of the bullet between the point at which it had fractured the eleventh rib and that at which it entered the first lumbar vertebra was considerably dilated, and the pus had burrowed downwards through the adipose tissue behind the right kidney, and thence had found its way between the peritoneum and the right iliac fascia, making a descending channel which extended almost to the groin. The adipose tissue behind the kidney in the vicinity of this descending channel, was much thickened and condensed by inflammation. In the channel, which was found almost free from pus, lay the flexible catheter introduced into the wound at the commencement of the autopsy; its extremity was found, doubled upon itself, immediately beneath the peritoneum, reposing upon the iliac fascia, where the channel was dilated into a pouch of considerable size. This long-descending channel, now clearly seen to have been caused by the burrowing of pus from the wound, was supposed during life to have been the track of the bullet.

The last dorsal, together with the first and second lumbar vertebrae and the twelfth rib, were then removed from the body for more thorough examination.

When this examination was made it was found that the bullet had penetrated the first lumbar vertebra in the upper part of the right side of

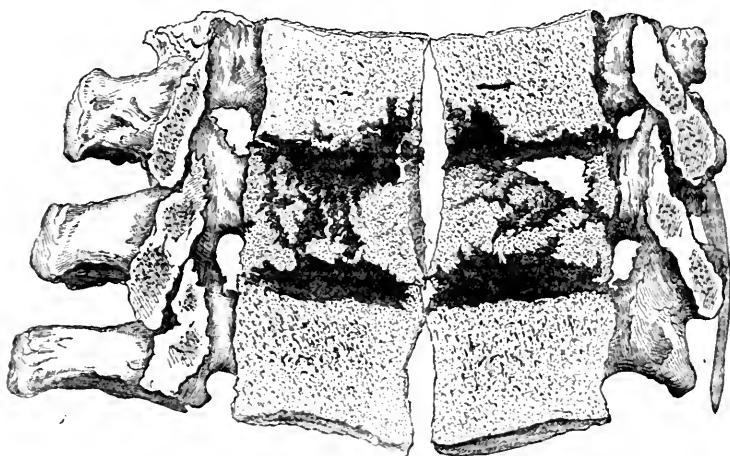
its body. The aperture by which it entered involved the intervertebral cartilage next above, and was situated just below and anterior to the intervertebral foramen, from which its upper margin was about one-quarter of an inch distant. Passing obliquely to the left and forwards through the upper part of the body of the first lumbar vertebra the bullet emerged

Fig. 1.



Shows the course of the ball through the first lumbar vertebra, its direction being indicated by the probe.

Fig. 2.



Shows the above specimen sawn open.

by an aperture, the centre of which was about half an inch to the left of the median line, and which also involved the intervertebral cartilage next above. The cancellated tissue of the body of the first lumbar vertebra was very much comminuted and the fragments somewhat displaced. Several deep fissures extended from the track of the bullet into the lower part of the body of the twelfth dorsal vertebra. Others extended through the first lumbar vertebra into the intervertebral cartilage between it and

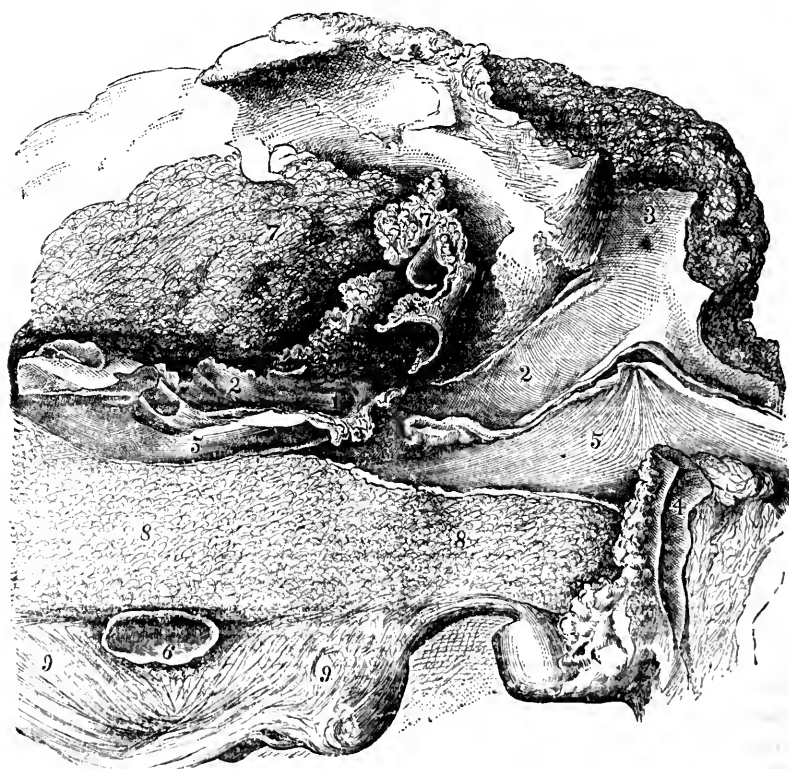
the second lumbar vertebra. Both this cartilage and that next above were partly destroyed by ulceration. A number of minute fragments from the fractured lumbar vertebra had been driven into the adjacent soft parts.

It was further found that the right twelfth rib also was fractured at a point one inch and a quarter to the right of the transverse process of the twelfth dorsal vertebra; this injury had not been recognized during life.

On sawing through the vertebra, a little to the right of the median line, it was found that the spinal canal was not involved by the track of the ball. The spinal cord and other contents of this portion of the spinal canal presented no abnormal appearances. The rest of the spinal cord was not examined.

Beyond the first lumbar vertebra the bullet continued to go to the left, passing behind the pancreas to the point where it was found. Here it was enveloped in a firm cyst of connective tissue, which contained besides the ball a minute quantity of inspissated, somewhat cheesy pus, which formed a thin layer over a portion of the surface of the lead. There was also a black shred adherent to a part of the cyst-wall, which proved on micro-

Fig. 3.



1. The point at which the splenic artery gave way. 2, 2. The splenic artery. 3. The coeliac axis. 4. The superior mesenteric artery. 5, 5. The splenic vein. 6. The cyst in which the ball was found. 7, 7. A portion of the mass of extravasated blood. 8, 8. The pancreas. 9, 9. Adipose tissue behind the transverse meso-colon.

surgical examination to be the remains of a blood-clot. For about an inch from this cyst the track of the ball behind the pancreas was completely obliterated by the healing process. Thence, as far backward as the body of the first lumbar vertebra, the track was filled with coagulated blood, which extended on the left into an irregular space rent in the adjoining adipose tissue behind the peritoneum and above the pancreas. The blood had worked its way to the left, bursting finally through the peritoneum behind the spleen into the abdominal cavity. The rending of the tissues by the extravasation of this blood was undoubtedly the cause of the paroxysms of pain which occurred a short time before death.

This mass of coagulated blood was of irregular form and nearly as large as a man's fist. It could be distinctly seen from in front, through the peritoneum, after its site behind the greater curvature of the stomach had been exposed by the dissection of the greater omentum from the stomach, and especially after some delicate adhesions between the stomach and the part of the peritoneum covering the blood-mass had been broken down by the fingers. From the relations of the mass as thus seen it was believed that the hemorrhage had proceeded from one of the mesenteric arteries, but as it was clear that a minute dissection would be required to determine the particular branch involved, it was agreed that the infiltrated tissues and the adjoining soft parts should be preserved for subsequent study.

On the examination and dissection made in accordance with this agreement, it was found that the fatal hemorrhage proceeded from a rent, nearly four-tenths of an inch long in the main trunk of the splenic artery two inches and a half to the left of the celiac axis. This rent must have occurred at least several days before death, since the everted edges in the slit in the vessel were united by firm adhesions to the surrounding connective tissue, thus forming an almost continuous wall bounding the adjoining portion of the blood-clot. Moreover, the peripheral portion of the clot in this vicinity was disposed in pretty firm concentric layers. It was further found that the cyst below the lower margin of the pancreas, in which the bullet was found, was situated three inches and a half to the left of the celiac axis.

Besides the mass of coagulated blood just described, another, about the size of a walnut, was found in the greater omentum near the splenic extremity of the stomach. The communication, if any, between this and the larger hemorrhagic mass could not be made out.

The examination of the *Thoracic Viscera* resulted as follows:—

The *Heart* weighed eleven ounces. All the cavities were entirely empty except the right ventricle, in which a few shreds of soft, reddish, coagulated blood adhered to the internal surface. On the surface of the mitral valve there were several spots of fatty degeneration; with this exception the cardiac valves were normal. The muscular tissue of the heart was soft, and tore easily. A few spots of fatty degeneration existed in the lining membrane of the aorta just above the semilunar valves, and a slender clot of fibrin was found in the aorta, where it was divided, about two inches from these valves, for the removal of the heart.

On the right side slight pleuritic adhesions existed between the convex surface of the lower lobe of the lung and the costal pleura, and firm adhesions between the anterior edge of the lower lobe, the pericardium and the diaphragm. The *Right Lung* weighed thirty-two ounces. The posterior part of the fissure, between its upper and lower lobes, was congenitally incomplete. The lower lobe of the right lung was hypostatically congested, and considerable portions, especially towards its base, were the seat of broncho-pneumonia. The bronchial tubes contained a considerable quantity of stringy muco-pus; their mucous surface was reddened by catarrhal bronchitis. The lung-tissue was œdematous,¹ but contained no abscesses or infarctions.

On the left side the lower lobe of the lung was bound, behind to the costal pleura, above to the upper lobe, and below to the diaphragm by pretty firm pleuritic adhesions. The *Left Lung* weighed twenty-seven ounces. The condition of its bronchial tubes and of the lung-tissue was very nearly the same as on the right side, the chief difference being that the area of broncho-pneumonia in the lower lobe was much less extensive in the left lung than in the right. In the lateral part of the lower lobe of the left lung, and about an inch from its pleural surface there was a group of four minute areas of gray hepatization, each about one-eighth of an inch in diameter. There were no infarctions, and no abscesses in any part of the lung-tissue.

The surgeons assisting at the autopsy were unanimously of the opinion that on reviewing the history of the case in connection with the autopsy, it is quite evident that the different suppurating surfaces, and especially the fractured spongy tissue of the vertebra, furnish a sufficient explanation of the septic conditions which existed during life.

About an hour after the post-mortem examination was completed the physicians named at the commencement of this report assembled for further consultation in an adjoining cottage; a brief outline of the results of the post-mortem examination was drawn up, signed by all the physicians, and handed to Private Secretary J. Stanley Brown, who was requested to furnish copies to the newspaper press.

(Signed) D. W. BLISS,
 " J. K. BARNES,
 " J. J. WOODWARD,
 " ROBERT REYBURN,
 " D. S. LAMB.

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As the above report contains paragraphs detailing the observations made at Washington on the pathological specimens preserved for that purpose, the names of Drs. F. H. Hamilton, D. Hayes Agnew, and A. H. Smith are not appended to it. It has, however, been submitted to them and they have given their assent to the other portions of the report.

¹ A part at least of this condition was doubtless due to the extravasation of the injecting fluid used by the embalmer.



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